A COMPARITIVE STUDY OF DRAINAGE PROCEDURES IN CHRONIC PANCREATITIS

GOVERNMENT MOHAN KUMARAMANGALAM

MEDICAL COLLEGE, SALEM

Dissertation submitted to

THE TAMIL NADU DR. MGR. MEDICAL UNIVERSITY

CHENNAI – 600 032

In partial fulfillment of the regulations

For the awards of the degree of

M.S. DEGREE BRANCH – I

GENERAL SURGERY

GOVERNMENT MOHAN KUMARAMANGALAM

MEDICAL COLLEGE, SALEM,

TAMILNADU.

SEPTEMBER 2015

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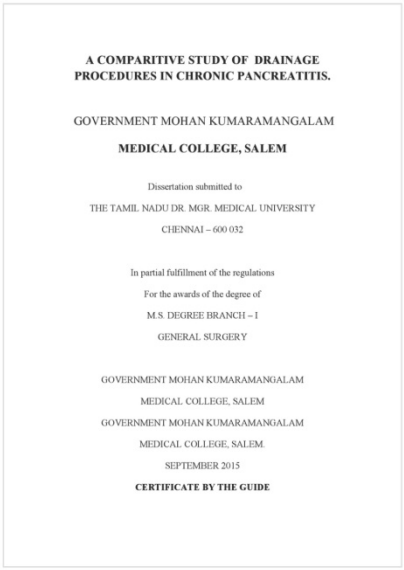

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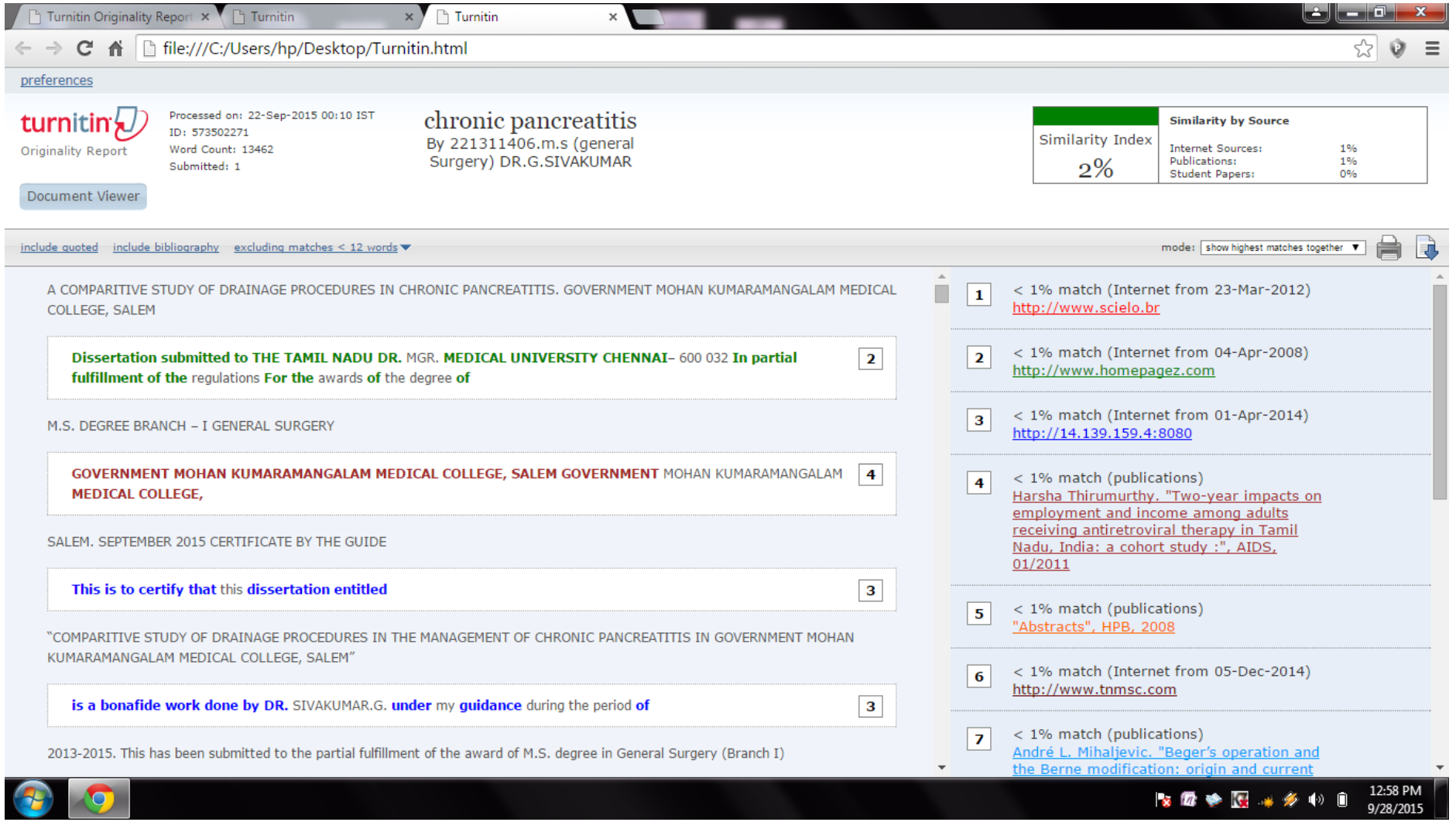
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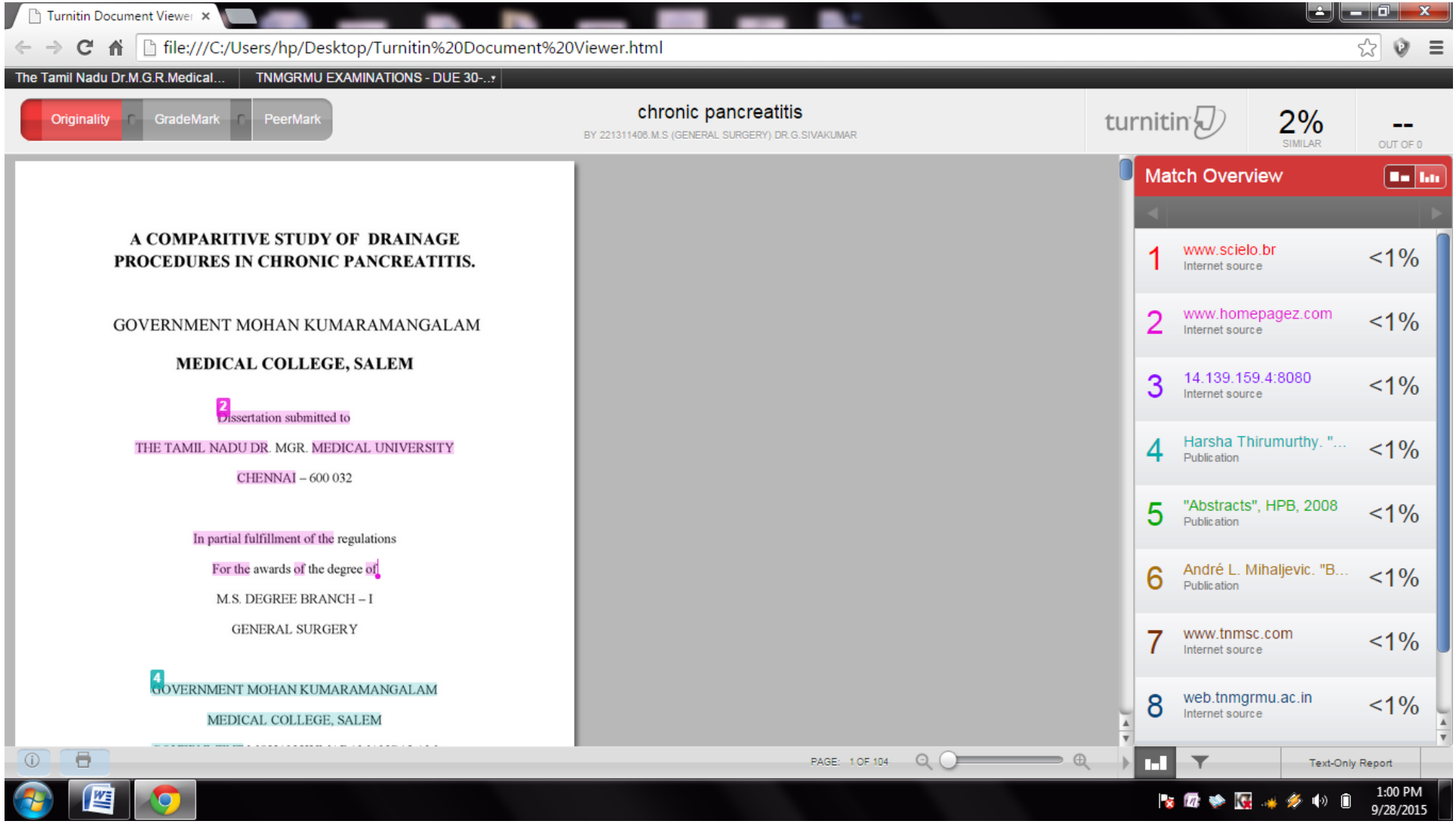
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ABSTRACT

Background

Chronic pancreatitis is a progressive inflammatory disorder characterized by irreversible destruction of pancreatic parenchyma and may be associated with disabling chronic pain and permanent loss of endocrine and exocrine function. Main indication for surgery is intractable abdominal pain and choosing the best technique to be used for a patient remains a challenge.

Objectives

The study is intended to know the etiology, incidence, pathogenesis, clinical manifestation and the outcome of the following three methods of surgical management chronic pancreatitis namely,

1.FREY'S PROCEDURE,

2.PUESTOW GILLESBY PROCEDURE &

3.IZBICKE'S PROCEDURE.

Also to study complications of these procedures and recurrences if any.

Method

This is a prospective cross sectional study, where 32 patients admitted to our hospital with chronic calcifying pancreatitis, who met with the inclusion and exclusion criteria, were subjected to clinical examination and relevant investigations. The treatment is carried out depending upon the magnitude of disease, size of the main pancreatic duct, parenchymal calcification and patient's predominant symptom. The results are evaluated and analyzed by comparing with other previous standard results.

Results

A male preponderance noted to be about 30:2 in this study. Mean age of presentation was noticed to be in the range of thirty to forty years. This disease was found to be more prevalent in persons who are chronic alcoholic.

Clinically patients presented with chronic abdominal pain with diabetes mellitus and malabsorbtion due to endocrine & exocrine insufficiency. All the patients had radiological abnormalities. The complications noted were wound infection, wound dehiscence & postoperative persistent pain.On comparing with post operative pain relief,improvement of exocrine & endocrine function of pancreas,improvement of performance status of the patient among the three surgical procedures compared FREY'S PROCEDURE is the more effective comparing to other two procedures.

Conclusion

In this study it is found that the most common etiology for chronic pancreatitis was chronic alcoholism in the middle aged male . chronic pancreatitis is mainly a radiological diagnosis. Of the various treatment modalities available for the treatment of this disease Frey's procedure has lower complication rates, better pain relief, improvement of exocrine and endocrine functions and overall improvement in quality of life.

Key words

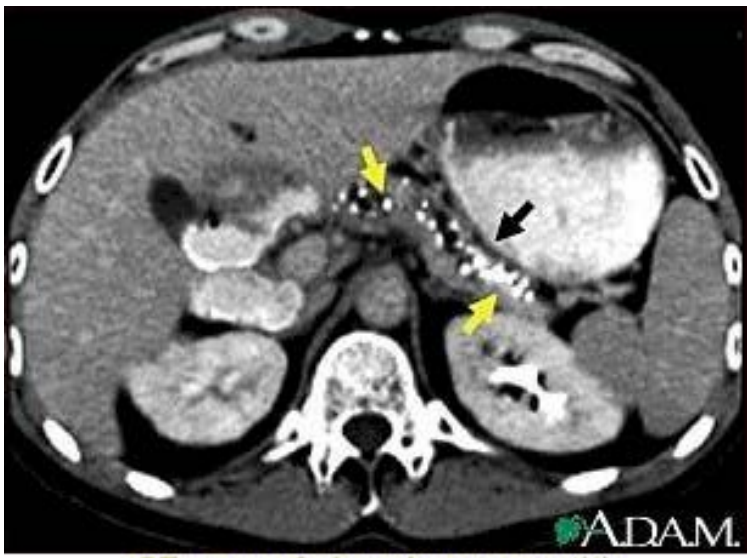
Chronic calcifying pancreatitis, resection and drainage procedures, FREY'S PROCEDURE,PUESTOW GILLESBY PROCEDURE & IZBICKE'S PROCEDURE, Complications, Recurrence, Anastomosis.

INTRODUCTION

Chronic pancreatitis is a progressive inflammatory process of the pancreas leading eventually over several years to pancreatic “cirrhosis”. Chronic pancreatitis Clinically, is usually characterised by an initial stage of recurrent acute pancreatitis (early stage CP) and progressive pancreatic dysfunction and/or calcification (late-stage CP). Alcohol abuse is the prominent risk factor of CP (70%), while CP remains aetiologically undetermined in about 25% or is related to rare causes such as genetic mutations, hyperparathyroidism, trauma or “autoimmunity”[4].

Surgery is frequently indicated for relief of debilitating pain as well as to address other complications, and three operations have proven effective. The pancreatico-duodenectomy (Whipple) procedure results in excellent long-term pain relief,but is associated with a low mortality rate and a persistent risk of early and late complications. The duodenum-preserving pancreatic head resection (DPPHR) introduced by Beger et al, and the local resection of the pancreatic head with longitudinal pancreatico-jejunostomy (LR-LPJ) devised by Frey,achieve the same high rate of pain relief long term but are associated with lower rates of perioperative complications and a decreased incidence of diabetes long term.[9] All 3 operations address the head of the pancreas as the

nidus of persistent inflammation, and all 3 achieve success with both dilated and nondilated duct disease. The LR-LPJ has a lower risk of perioperative problems and may be easier to perform.



CT scan of chronic pancreatitis

OBJECTIVES OF STUDY

1) To compare the following techniques in the management of chronic pancreatitis

    1. FREY'S PROCEDURE
    2. PUESTOW GILLESBY PROCEDURE &
    3. IZBICKE'S PROCEDURE.

2) To study the rate of success of these three procedures in the management of chronic pancreatitis and its complications, recurrences if any.

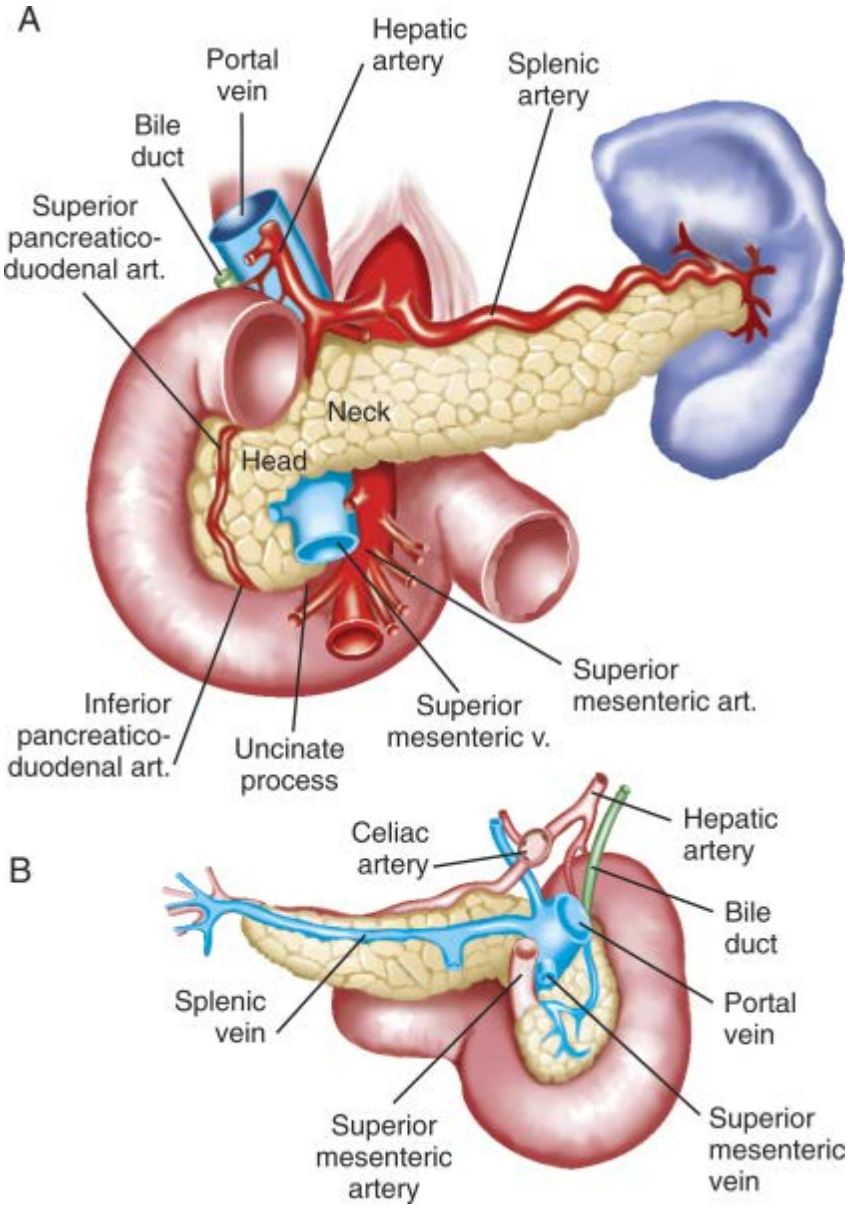
REVIEW OF LITERATURE

Historical aspects

Operative approaches to the treatment of chronic pancreatitis have undergone dramatic a transformation over the past few decades as the head of the pancreas has become universally appreciated as the nidus of chronic inflammation[12].Furthermore prospective randomized trials have repeatedly shown the superiority of surgical treatment over medical approaches to management. Since the publication of the definitive “History of the Pancreas” by Howard and Hess in 2002 as well as other recent reviews, new information and the results of prospective trials have further clarified the value of the latest “hybrid” approaches to the treatment of this disease.[16]

Relevant Anatomy

The pancreas is a soft, elongated, flattened gland 12 to 20 cm in length. The adult gland weighs between 70 and 110 g. The head lies behind the peritoneum of the posterior abdominal wall and has a lobular structure. The pancreas is covered with a fine connective tissue but does not have a true capsule. The head of the pancreas is on the right side and lies within the curvature of the duodenum. The neck, body, and tail of the pancreas lie obliquely in the posterior abdomen, with the tail extending as far as the gastric surface of the spleen.



(Fig. 53-1).

The duct of Wirsung is the main pancreatic duct extending from the tail of the organ to the major duodenal papilla, or ampulla of Vater. The widest part of the duct is in the head of the pancreas (4 mm), tapering to 2 mm at the tail in adults. The duct of Wirsung is close, and almost parallel, to the distal common bile duct before combining to form a common duct channel prior to approaching the duodenum. In approximately 70% of people, an accessory

pancreatic duct of Santorini (dorsal pancreatic duct) is present. This duct may communicate with the main pancreatic duct. The degree of communication of the dorsal and ventral duct varies from patient to patient.

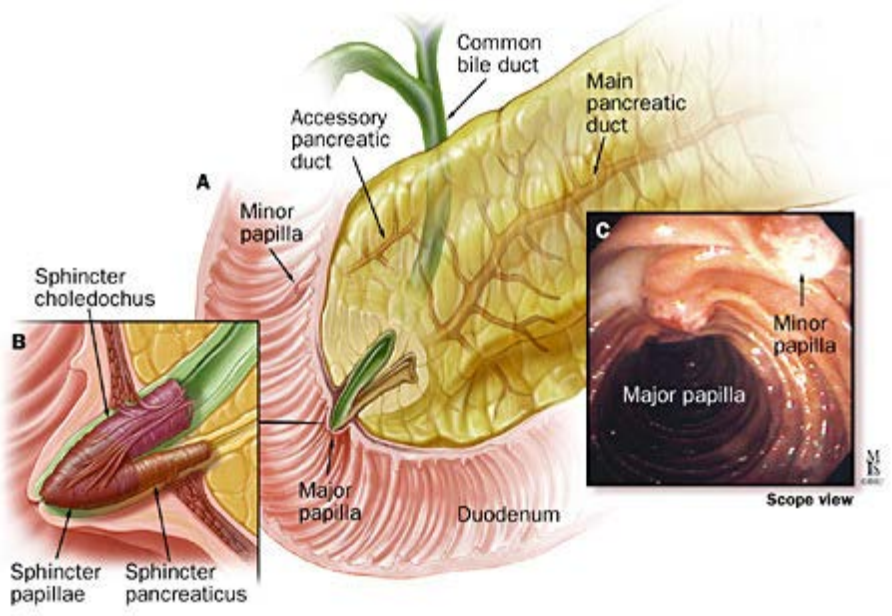


Figure 5. A, Anatomy of the major and minor papilla; B, sphincter of Oddi; C, endoscopic view.

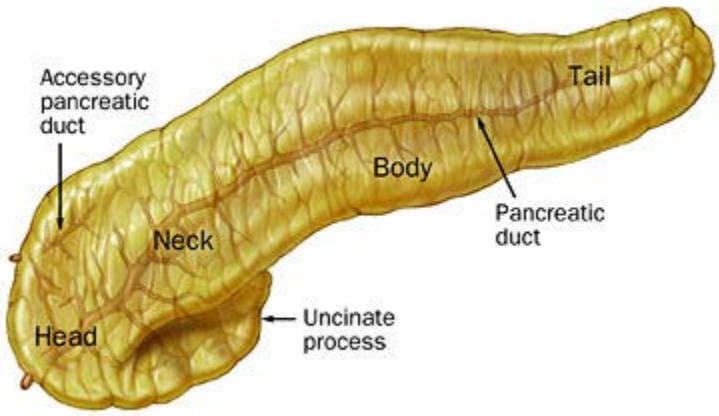


Figure 6. Regions of the pancreas

Incidence

In 1998, Lankisch and Banks reported that the prevalence of chronic pancreatitis in many parts of the world appeared to be in the range of 3–10 per 100,000 people . Most cases of chronic pancreatitis require hospitalization due to the presence of pain as well as to the appearance of other complications. In Italy, according to the data reported by the Department of the Welfare in 2005 [7], the rate of patients discharged for chronic pancreatitis is 32.9 per 100,000 hospitalized patients (Figure 1). The age of the major part of these patients ranges from 45 to 64 years (Figure 1) and the majority are males (Figure 2). The mean length of hospitalization is 9.8 days and this figure is higher as compared to that of all patients with diseases other than chronic pancreatitis (7.5 days). Finally, in Italy the trend of hospitalization for chronic pancreatitis seems to have decreased from 1999 to 2005 (Figure 3). There is no doubt that, in Western countries, alcohol is the most frequently associated factor of chronic pancreatitis, chronic alcoholic pancreatitis presents mainly in young adults of 30–40 years of age, and the prevalence is higher in the male gender. In these countries, in the period from 1940 to 2003, alcohol frequency increased as an etiological factor of chronic pancreatitis from 19 [8] to 50% [9] and even up to 80% [10-12]. The results of the latter study regarding the etiology of chronic

pancreatitis were subsequently confirmed by others in Europe [13-19] as well as in Brazil [20], Australia [21] and South Africa [22]. On the other hand, four consecutive surveys carried out in Japan (from 1970 to 1977, from 1977 to 1984, in 1994, and in 1999, respectively) [23] showed that alcohol as an etiological factor accounted for less than 60% and this figure is similar among the various periods studied.

Aetiology

Alcohol

The most common cause of chronic pancreatitis in Western societies is alcohol. Alcohol consumption has been implicated in approximately 70% of cases as a major cause of this disease.[19] Developing between 30 and 40 years of age, this chronic pancreatitis is more common in men than in women. A direct relationship existsbetween the daily consumption of alcohol and the risk of development of chronic pancreatitis. Although the length of time required to produce symptoms is unknown,there is clearly a correlation between the quantity and duration of alcohol consumption and the risk of developing chronic pancreatitis. It is estimated that alcohol intake greater than 20g per day over a period of 6–12 years produces changes consistent with chronic pancreatitis. There are several theories regarding the mechanism by which

alcohol produces chronic pancreatitis; however, the exact mechanism is unknown.

Pancreas Divisum

The most common congenital anomaly of the pancreas, pancreas divisum, occurs in approximately 10% of the population and results from incomplete or absent fusion of the dorsal and ventral ducts during embryological development. In pancreas ivisum, the ventral duct of Wirsung empties into the duodenum through the major papilla, but drains only a small portion of the pancreas (ventral portion). Other regions of the pancreas, including the tail, body, neck, and the remainder of the head, drain secretions into the duodenum through the minor papilla via the dorsal duct of Santorini (hence the term dominant dorsal duct syndrome) (Figure 8).

Recent clinical trials have supported the concept that obstruction of the minor papilla may cause acute pancreatitis or chronic pancreatitis in a subgroup of patients with pancreas divisum. Endoscopic or surgical therapy directed to the minor papilla has been effective in treating these patients.

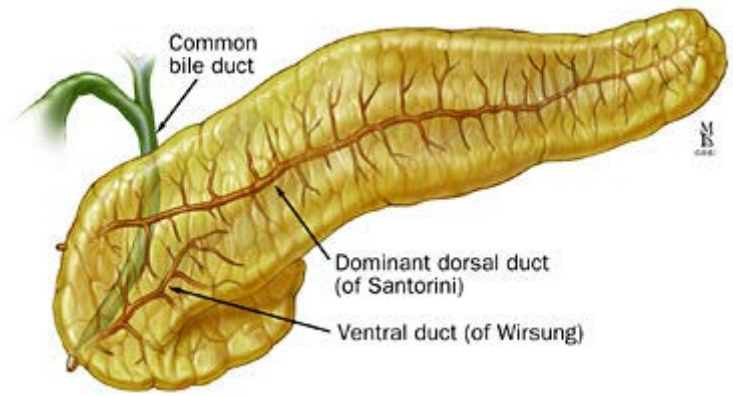


Figure 8. Anatomy of pancreas divisum.

Tropical Pancreatitis

Tropical pancreatitis is found predominantly throughout Asia, Africa and other tropical locales. Men and women are affected with equal frequency without any known etiological factors. Young people (mean age at onset, 12–15 years) may be affected. Although the etiology is speculative, malnutrition may play an important role in its pathogenesis. Patients usually develop recurrent abdominal pain in childhood and diabetes mellitus later in life.[24] Pancreatic stone formation is present in the majority of these patients.

Hyperparathyroidism

Chronic pancreatitis occurs in untreated hyperparathyroidism. Hypercalcemia is thought to be the mechanism by which hyperparathyroidism causes chronic pancreatitis. Hypercalcemia causes an increase in calcium secretion by the pancreas. In the animal model, hypercalcemia causes

stimulation of the acinar cell, increases calcium secretion, and alters the diffusion barrier between the pancreatic duct lumen and the interstitial space.

Trauma

Trauma to the back or abdomen may produce pancreatic injury (Figure 9A) leading to chronic pancreatitis. Trauma may result in inflammation and the formation of pseudocysts or strictures (Figure 9B). Many cases of pancreatic injury are associated with ductal disruption.[34]

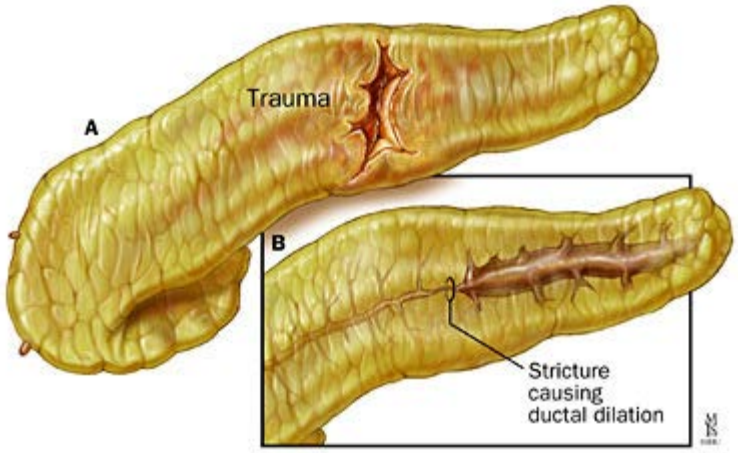


Figure 9. A, B, Pancreatic injury from trauma.

Obstructive pancreatitis

Chronic pancreatitis is also associated with obstruction of the pancreatic duct secondary to strictures related to pancreatic inflammation, or benign or malignant tumors. Sphincter of Oddi dysfunction involving the pancreatic or ampullary sphincter of the duct is thought to be another cause. Pathological

findings in this type of pancreatitis include the absence of intraductal calculi or plugs, and uniform dilation of the duct distal to the obstruction site.

Idiopathic Chronic Pancreatitis

Idiopathic chronic pancreatitis is the major form of nonalcoholic disease in Europe and North America, occurring in 10–40% of those with chronic pancreatitis. This form of pancreatitis affects juveniles, with an onset of symptoms at a median age of 18. The senile type appears to peak at 60 years of age. Arteriosclerosis has been suggested as a cause of senile chronic pancreatitis, although firm evidence implicating vascular insufficiency is lacking.

Cystic Fibrosis

There is an association between patients with pancreatitis and mutation of the cystic fibrosis transmembrane conductance regulator (CFTR) gene. In this subset of patients, there is no evidence of cystic fibrosis lung disease. It is possible that some patients who carry the diagnosis of idiopathic pancreatitis may well have pancreatitis as a result of this genetic mutation.[44]

Hereditary Chronic Pancreatitis

Hereditary chronic pancreatitis appears in childhood at a mean age of 10–12 years. This form of pancreatitis affects familial groups and involves a small number of related individuals. Hereditary chronic pancreatitis is transmitted through an autosomal dominant gene of incomplete penetrance, and the incidence is relatively equal in both sexes. The majority of these patients express one of two mutations (which are R122H or N29I) in the cationic trypsinogen gene (PRSS1 gene). This defect prevents deactivation of trypsinogen resulting in autodigestion. Hereditary chronic pancreatitis is characterized by recurrent attacks of abdominal pain.[44] Diabetes develops in approximately 20% of these patients 8–10 years after the onset of pain. Hereditary chronic pancreatitis has about a 40% lifetime risk of pancreatic cancer with patients in the fifth to seventh decades of life having the highest risk.

Pathogenesis of Alcoholic Pancreatitis

The mechanism which determines the main manifestation of chronic pancreatitis, i.e., fibrosis of the pancreatic gland, has been well summarized by Taludkar *et al.* [40]. In brief, the oxidation of ethanol to acetaldehyde determines the activation of the pancreatic stellate cells in the quiescent state without any pre-activation; this process generates a state of oxidant stress

within the pancreatic stellate cells which subsequently activates the downstream pathways of the fibrogenesis. This finding implies that, in the human pancreas, pancreatic stellate cells may be stimulated early during chronic alcohol intake even in the absence of necro-inflammation.

The importance of the oxidative stress in chronic pancreatitis patients has also been reported using breath analysis [41]. In this study, H2S, NO and a substance having a molecular mass of 66 u (M66) were those which had significantly higher breath concentrations in chronic pancreatitis patients than in healthy subjects after adjustment for the significant differences in H2S, M66, and NO were found between patients with and without alcoholic pancreatitis.

Regarding the pancreatic stellate cells, in 1982, Watari *et al.* [42] reported the presence of vitamin A-containing cells in the vitamin A-fed rat pancreas. These were later described and characterized as stellate cells in the rat and the human pancreas [43,44]. Pancreatic stellate cells are morphologically similar to hepatic stellate cells. They have long cytoplasmic processes and are situated close to the pancreatic acini.

In the quiescent state, these cells contain lipid droplets, store vitamin A and express markers such as desmin, glial fibrillary acidic protein, neural cell adhesion molecule and neurotrophin nerve growth factor just as hepatic stellate cells do. Pancreatic stellate cells contain enzyme alcohol dehydrogenase [45] and, when activated, they assume a myofibroblast-like phenotype [46].

Activated pancreatic stellate cells are characterized by the disappearance of fat globules and the expression of alpha-smooth muscle actin. These cells have proliferative and migratory [47-49] functions, and they also synthesize and secrete extracellular fibrous tissue matrix proteins, matrix metalloproteinases and their inhibitors [50]; it has also been demonstrated that pancreatic stellate cells have phagocytic activity [51]. Thus, the ability of pancreatic stellate cells to synthesize as well as to degrade extracellular matrix proteins suggests their role in maintaining a normal pancreatic architecture which can shift towards fibrogenesis if the balance is altered. Ethanol, acetaldehyde and oxidant stress are capable of activating pancreatic stellate cells via three mitogen-activated protein kinase pathways [52], namely extracellular signal kinase, p38 kinase and c-jun amino terminal kinase [53-55], and ethanol and acetaldehyde are also capable of activating phosphatidylinositol 3-kinase and protein kinase C [56]. On the other hand, extracellular signal kinase activation occurs via a signal transduction pathway which involves G-protein Ras and serine threonine protein kinase Raf-1 [57,58]. The Ras superfamily G proteins undergo post-translational modification involving isoprenylation, a process which requires intermediate substrates of cholesterol biosynthesis [59,60] which is regulated by HMG CoA reductase [61]. The paracrine pro-fibrogenic effect of TGF-beta

on pancreatic stellate cells is mediated via Smad while the autocrine effect is mediated through the extracellular signal kinase pathway [62]; furthermore, the role of the peroxisome proliferator-activated receptor-gamma seems to be involved in the activation of pancreatic stellate cells [63,64].

The major parts of the studies published on pancreatic stellate cells have been carried out on experimental animals; thus, the study of Suda *et al.* seems to be of particular interest because it was carried out on humans [65]. These authors investigated the distribution of activated pancreatic stellate cells or myofibroblasts using immunohistochemistry and a computer-counting device in relation to fibrogenesis in 24 patients with clinically diagnosed chronic alcoholic pancreatitis. In all cases, fibrosis was patchily distributed in the perilobular or interlobular areas accompanied by a cirrhosis-like appearance; it had extended into the intralobular area in advanced cases. Seven patients had a massive or confluent loss of exocrine tissue, resulting in extensive interlobular fibrosis; the more extensive the interlobular fibrosis, the smaller the lobules. Immunoreactivity to alpha-smooth muscle actin, a myofibroblast marker, was found mostly in the same areas of the fibrosis, mainly the interlobular and less often the periacinar, areas; the average percentage area of perilobular myofibroblasts was significantly higher than that of periacinar myofibroblasts

in 20 randomly selected lobules; the fibrosis also immunostained positive for collagen types I and III. In conclusion, this study, carried out on *Int. J. Environ. Res. Public Health* **2009**, *6* **2770** humans, further supports the hypothesis that the fibrotic alterations in chronic alcoholic pancreatitis are not due to recurrent episodes of necrotizing pancreatitis but the disease is due to a chronic stimulation of alcohol on pancreatic stellate cells which play an important role in pancreatic fibrogenesis.

Histology of Alcoholic Pancreatitis

According to the previously described pathogenesis, alcohol seems to induce pancreatic fibrosis (Figure 4) as it has frequently been found in autoptic series of alcoholics without a clinical history of chronic pancreatitis [66-68]. Two histological studies [69,70] were conducted on the pancreata of patients at the time of their first attack of acute alcoholic pancreatitis, and both studies found the presence of chronic lesions in the acutely inflamed pancreas. Moreover, in a clinical study [71] of 114 patients hospitalized for acute alcoholic pancreatitis as the first manifestation of pancreatic disease, a diagnosis of chronic pancreatitis was made in 105 (92%) of the 114 patients during the follow-up. These authors concluded that acute alcoholic pancreatitis

without underlying chronic pancreatitis does not exist or is extremely rare.

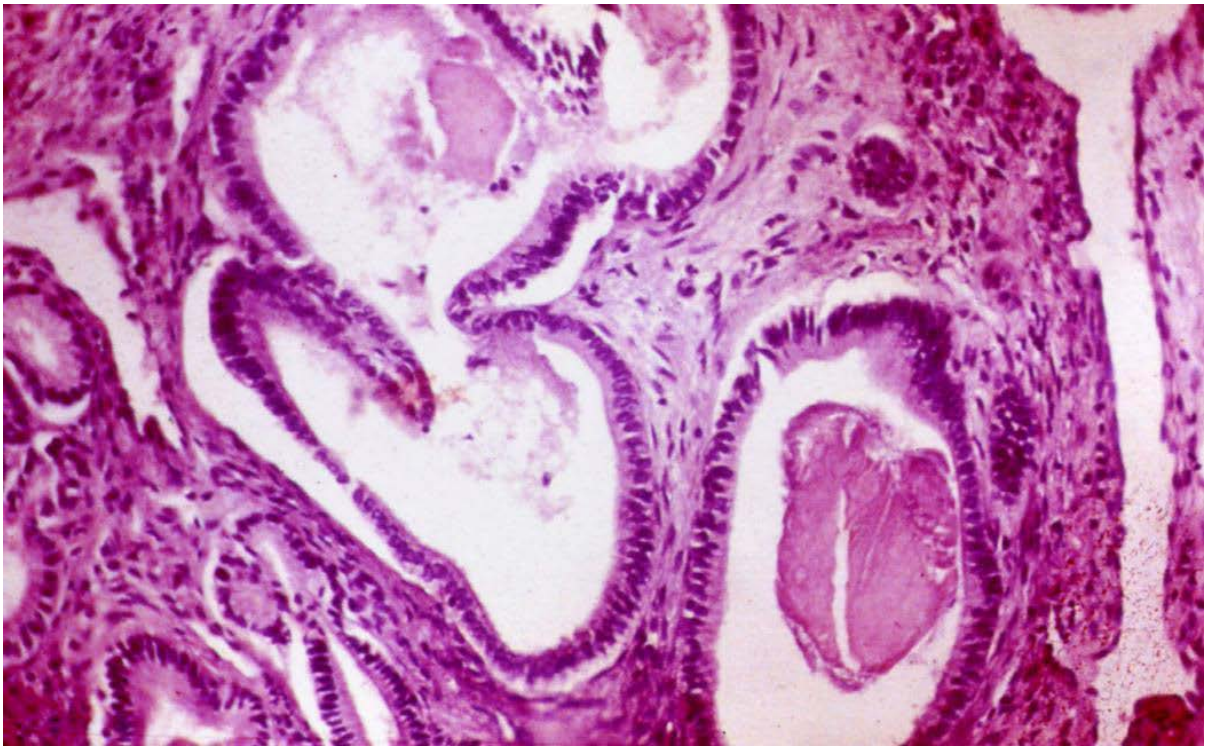


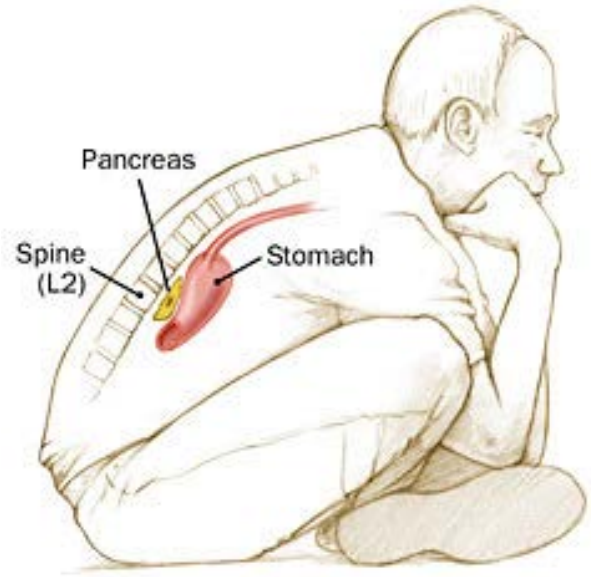
Figure 4. Typical pathological appearance of human chronic pancreatitis: Fibrosis, loss of acinar tissue, enlarged ducts and stones within some of them.

Based on the data of the literature and on our experience, we believe that the great majority (>90%) of alcoholic patients who present clinically with acute pancreatitis also have chronic lesions. The possibility that an alcoholic with acute pancreatitis has no chronic pancreatic lesions certainly cannot be excluded but, if this condition exists, it is rare [72].

A working hypothesis called-fibrosis sequence‘ has been also suggested for explaining the pathogenesis

Symptoms

The clinical presentation of chronic pancreatitis is usually abdominal pain, ranging from a sudden acute abdominal catastrophe to mild episodes of deep epigastric pain and possible vomiting. Chronic pancreatitis may produce constant, dull, unremitting abdominal pain, epigastric tenderness, weight loss, steatorrhea and glucose intolerance. Diarrhea may be chronic, with as many as six or more bowel movements per day. The diarrhea is caused by fat malabsorption, which results in bulky, foul-smelling stools that may appear oily and float (steatorrhea). With the head of the gland on the right side, lying within the curve of the duodenum at the second lumbar vertebra (L2) level of the spine (Figure 3), the pain of chronic pancreatitis often radiates to the back,although it may radiate to both upper and lower quadrants. Sitting up and leaning forward may help to relieve or reduce the discomfort.



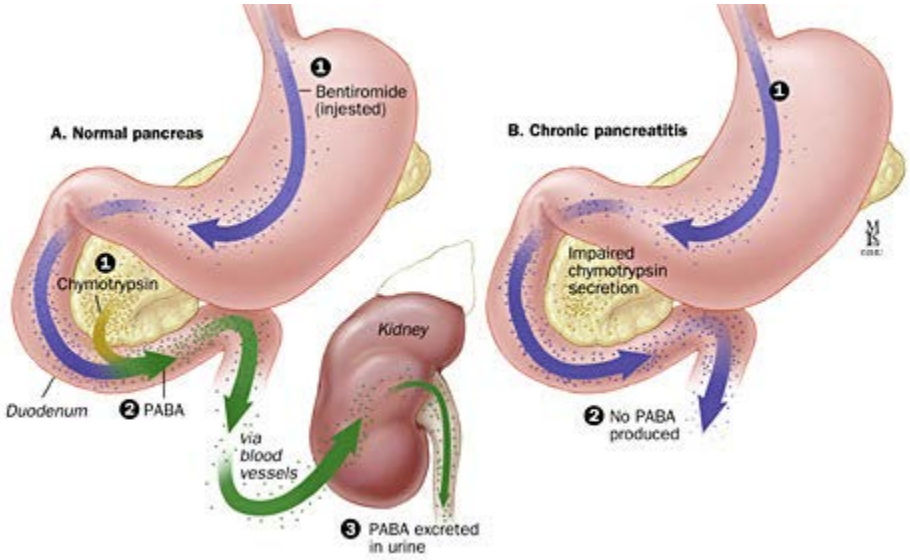
Typical posture to reduce pancreatic-type pain.

DiagnosisOver the years, numerous tests have been developed to diagnose chronic pancreatitis; however, their sensitivity and specificity are poor. To date, historical information, serum enzymes, exocrine function, and radiographic studies seem to be the most reliable indicators of the disease. Biochemical measurements of pancreatic function are helpful.

Biochemical Measurements

Isoamylase, lipase, trypsin, and elastase levels may be low, normal, or elevated in patients with chronic pancreatitis. In early or mild cases of chronic pancreatitis, it is difficult to make a definitive diagnosis based on serum enzyme levels alone.The secretin stimulation test is the most sensitive test to diagnose early pancreatic disease in patients who have developed malabsorption problems.The bentiromide test is inexpensive, convenient, and

easily available for diagnosis of advanced disease. This test, however, has a low sensitivity for diagnosing early or mild chronic pancreatitis. Essentially a urine test, it requires normal renal function, adequate diuresis, and proper absorption in the intestines. Para-aminobenzoic acid (PABA) is the result of the synthetic tripeptide bentiromide, cleaved by pancreatic chymotrypsin, in the duodenum and excreted in the urine (Figure 10A). Patients consistently excrete less PABA with chronic pancreatitis because of impaired chymotrypsin secretion by the pancreas (Figure 10B).



Bentiromide test; A, para-aminobenzoic acid (PABA) excreted in urine; B, chronicpancreatitis — little or no PABA in the urine.

Figure 10. Bentiromide test; A, para-aminobenzoic acid (PABA) excreted in urine; B, chronic pancreatitis — little or no PABA in the urine.

The quantitative measurement of fecal fat is diagnostic in determining malabsorption. In this test, a known quantity of dietary fat is consumed. Normally 7% or less of the ingested fat is detectable in the stool. In chronic pancreatitis, a two-stage test is more sensitive and specific. The test uses fecal collection with and without the use of pancreatic enzyme replacement to differentiate steatorrhea secondary to chronic pancreatitis from other causes. Steatorrhea due to chronic pancreatitis arises when 90% of pancreatic exocrine function has been lost.

Plasma cholecystokinin (CCK) may be elevated in chronic pancreatitis patients compared with those with normal pancreatic function.

Tests of pancreatic exocrine function may directly measure enzyme or bicarbonate secretions, or indirectly demonstrate malabsorption of a compound that requires pancreatic digestion for normal absorption. None of the methods targeted at exocrine function are absolutely accurate in terms of assessing exocrine secretion. In addition, none of these secretion assays appears to be able to differentiate chronic pancreatitis from carcinoma of the pancreas.

Radiological Testing

Plain Abdominal Film

A plain film of the abdomen is usually the first diagnostic test used to establish a diagnosis of chronic pancreatitis. Diffuse, speckled calcification of the gland may suffice as a positive finding

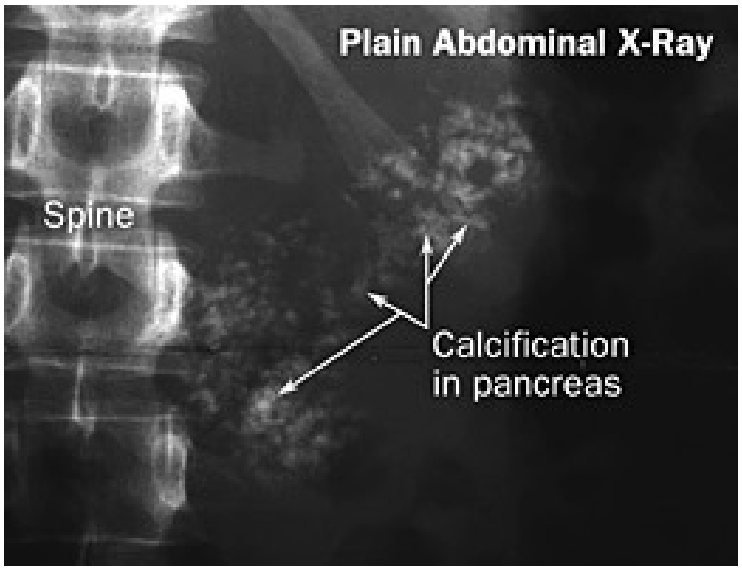


Figure 11. Abdominal x-ray showing diffuse calcification.

Transabdominal Ultrasound

Transabdominal ultrasound is a simple, noninvasive, and relatively inexpensive imaging technique. Findings of a dilated pancreatic duct (greater than 4 mm),calcification, and large cavities (greater than 1 cm) are associated with chronic pancreatitis. With a 70% sensitivity and 90% specificity, a satisfactory ultrasound examination negates the need for additional confirmatory testing.

Computed Tomography (CT)

More sensitive than transabdominal ultrasound, CT (computed tomography) scanning can demonstrate duct dilation, cystic lesions, and calcification (Figure 12). This technique is useful in discriminating chronic pancreatitis from pancreatic carcinoma.

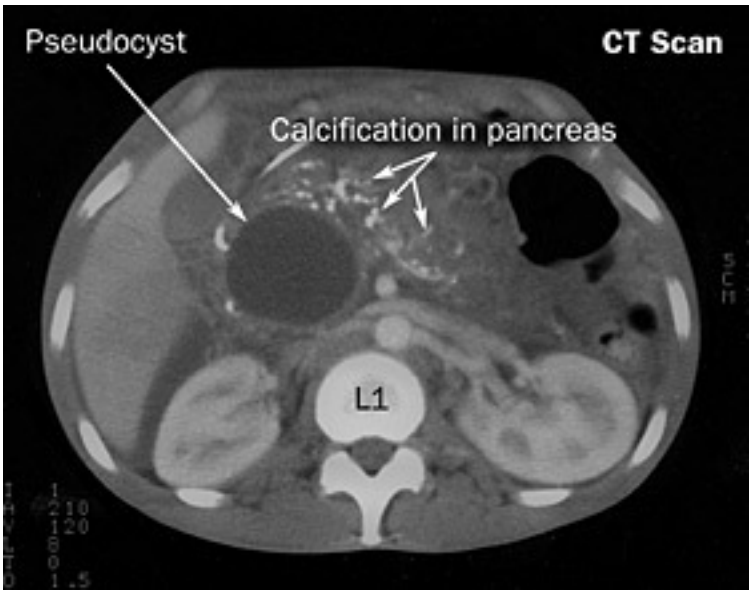


Figure 12. CT scan demonstrating chronic pancreatitis.

Magnetic Resonance Cholangiopancreatography (MRCP)

Magnetic resonance cholangiopancreatography (MRCP) represents a major advance in the demonstration of pancreatic ductal anatomy. MRCP yields satisfactory pancreatograms in patients with chronic pancreatitis in whom a CT scan showed no abnormalities. No ductal or intravenous injection of contrast medium is necessary,and the patient is not exposed to irradiation.

MRCP is derived from an enhanced MRI and may be adjusted to optimally visualize the biliary and pancreatic ducts (Figure 13). Dynamic secretin magnetic resonance pancreatography (DSMRP) has further advanced pancreatic visualization. DSMRP may improve the clinician's ability to detect early chronic pancreatitis. Further studies are needed to fully assess this novel approach.

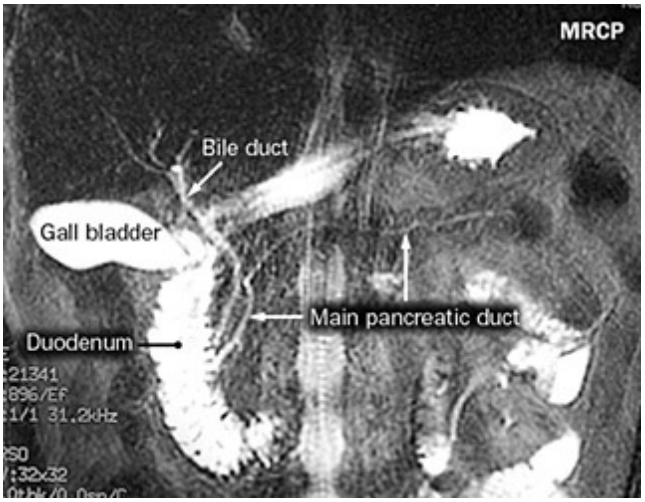


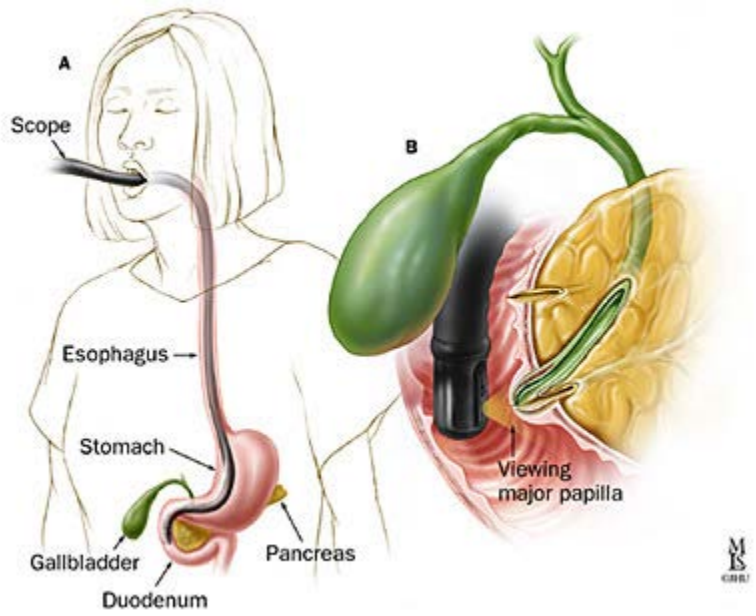
Figure 13. MRCP demonstrating chronic pancreatitis.

Endoscopic Diagnosis Gastrointestinal endoscopy allows the physician to visualize and biopsy the mucosa of the upper gastrointestinal tract. Endoscopy permits visualization of the esophagus, stomach and duodenum. The enteroscope allows visualization of at least 50% of the small intestine, including most of the jejunum and different degrees of the ileum. During these procedures, the patient may be given a pharyngeal topical anesthetic that helps

to prevent gagging. Pain medication and a sedative may also be administered before the procedure. The patient is placed in the left lateral position (Figure 14).

Figure 14. Room set-up and patient positioning for ERCP.

An endoscope is a thin, flexible, lighted tube that is passed through the mouth and pharynx and into the esophagus. The endoscope transmits an image of the esophagus, stomach and duodenum to a monitor, which is visible to the physician. The endoscopy room is equipped with an x-ray machine and monitor screen, which are used to help identify bile and pancreatic ducts. The endoscope introduces air into the stomach, expanding the folds of tissue and enhancing the examination of the stomach.



Position of the scope in the duodenum for ERCP.

Endoscopic Retrograde Cholangiopancreatography (ERCP)

ERCP is an endoscopic technique for visualization of the bile and pancreatic ducts. During this procedure, the physician inserts a side-viewing endoscope (Figure 16) in the duodenum facing the major papilla (Figure 15B). The side-viewing scope (duodenoscope) is specially designed to facilitate placement of endoscopic accessories into the bile and pancreatic ducts. The endoscopic accessories may be passed through the biopsy channel (Figure 16) into the ducts. A catheter is used to inject dye into both pancreatic and biliary ducts to obtain x-ray images using fluoroscopy (Figure 14). During the procedure, the physician is able to see two sets of images: the endoscopic

image of the duodenum and major papilla, and the fluoroscopic image of the bile and pancreatic ducts.

The endoscope is designed to be held in the left hand, with the thumb operating up and down angulation. The index finger operates the suction and air/water operations. The right hand is responsible for advancing, withdrawing and torquing the insertion tube. The right hand also operates left and right angulation of the endoscope and passes accessories through the instrument. A variety of instruments can be utilized through the endoscope (Figure 15B). Electrosurgical devices, such as snares, biopsy forceps, heater probes; BICAP devicesfor polyp removal and cauterization, dilation balloons, stents, catheters, and esophageal prostheses can be used. Lithotripsy devices, injection devices, brushes,forceps, scissors, and magnetic extraction devices may also be inserted through the endoscope. Cameras may be attached for photo-documentation and dual examiner viewing. Video cameras may also be attached for full-color motion picture viewing during endoscopic procedures or for later review.ERCP is a sensitive and specific diagnostic tool in chronic pancreatitis. ERCP shows details of the pancreatic ductal anatomy, including strictures, ductal rupture and pseudocysts (Figure 17) .Remarkable advances have been made in endoscopy over the last 25 years. Video technology has made gastrointestinal endoscopy

easier for the endoscopist and safer for the patient, and it facilitates a greater transfer of clinical information.The future holds the promise for even better devices and technology.

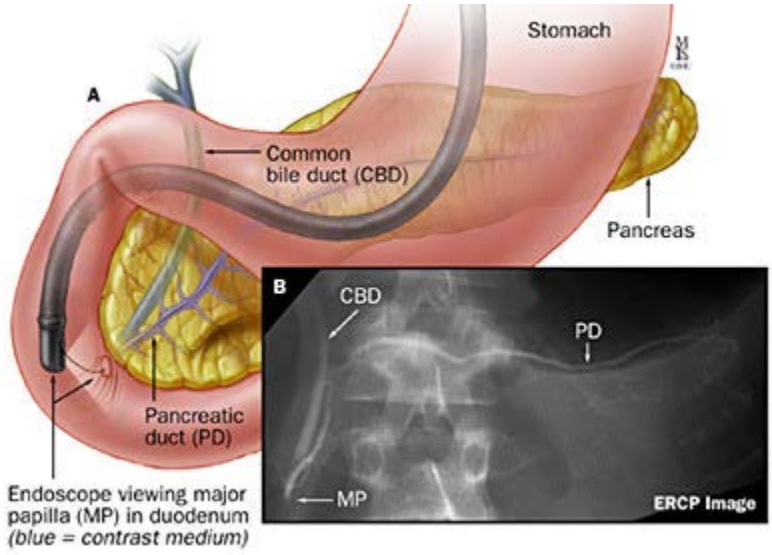


Figure 17. A, B, ERCP of normal pancreatic and biliary ducts.

The changes seen on ERCP (Figure 18A) are often inadequate to be of diagnostic value in the patient with chronic pancreatitis. Mild pancreatitis may present with minimal dilation of the main pancreatic duct and some clubbing of the side branches of the duct (Figure 18B).

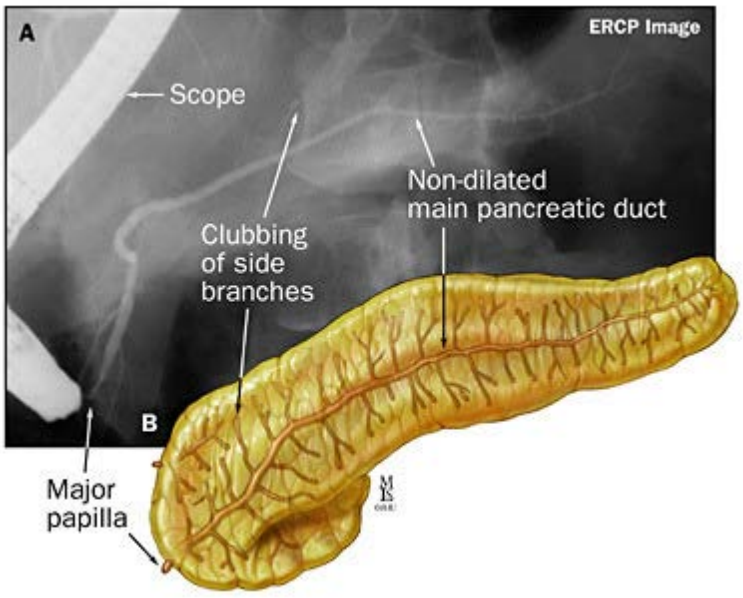


Figure 18. A, B, ERCP demonstrating mild chronic pancreatitis.

The patient with moderately-staged chronic pancreatitis shows moderate dilation of the main pancreatic duct (1.5 times the normal size) on endoscopic retrograde cholangiopancreatography (Figure 19A). This is accompanied by moderate clubbing of the side branches of the main pancreatic duct (Figure 19B)

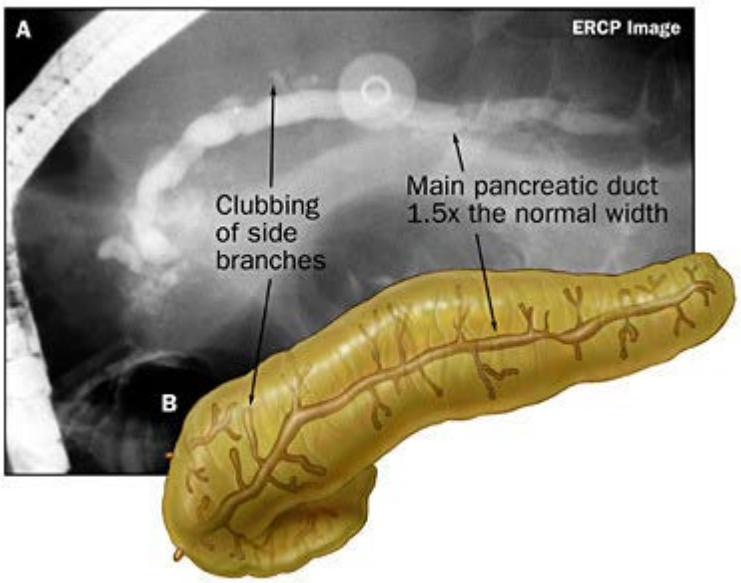


Figure 19. A, B, ERCP demonstrating moderate chronic pancreatitis.

A characteristic "chain of lakes" appearance of the main pancreatic duct can be noted on ERCP in patients with severe chronic pancreatitis (Figure 20A). The main pancreatic duct is enlarged (greater than 1.5 times) with increased tortuosity. There is severe clubbing and dilation of the side branches. Stone formation and occlusion of the pancreatic duct may occur in this stage of the disease (Figure 20B). On surgical examination of the organ, the gland is hard and grainy, and may beyellowish-gray.

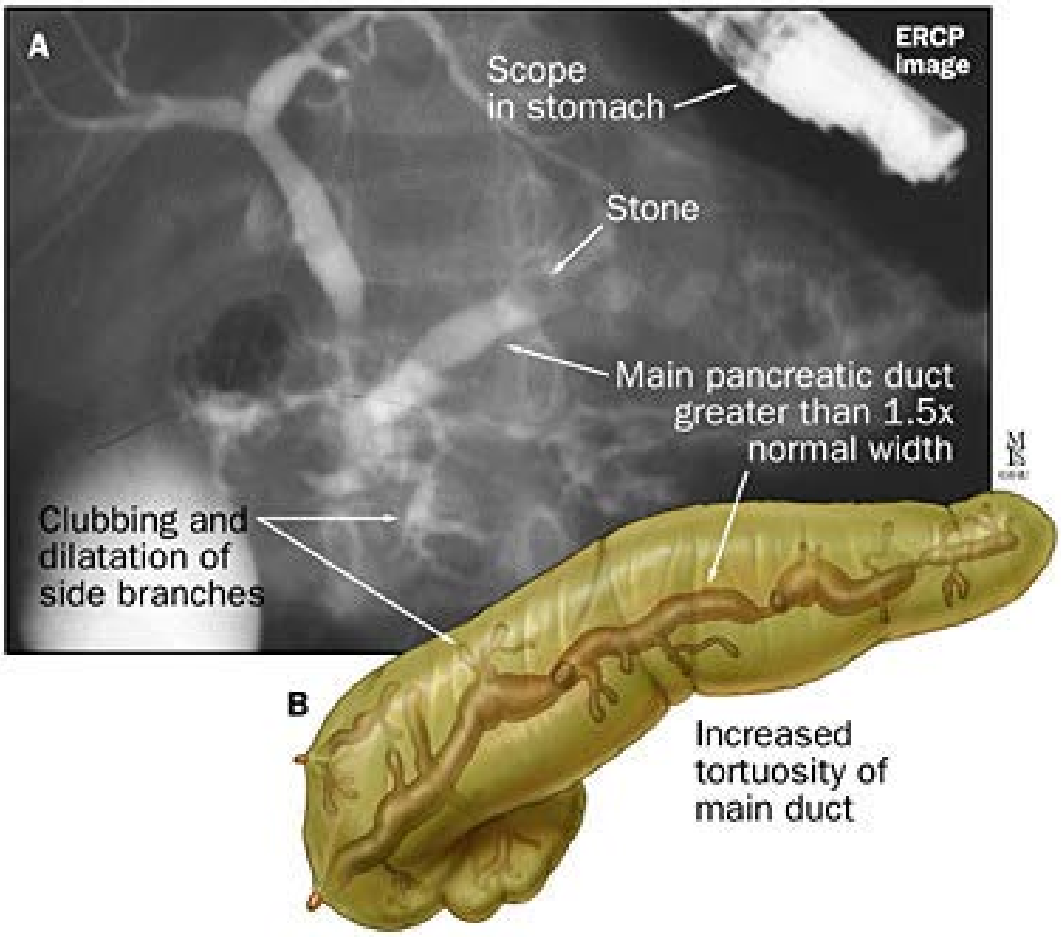


Figure 20. A, B. ERCP demonstrating severe chronic pancreatitis.

Endoscopic Ultrasonography (EUS)

Endoscopic ultrasonography is the most sensitive imaging tool for the diagnosis of chronic pancreatitis, and has been proven to be more accurate than the CT scan.Endoscopic ultrasound is a highly technical, low-risk diagnostic procedure that utilizes high-frequency ultrasound during endoscopy to evaluate and diagnose digestive tract disorders. EUS allows imaging of the pancreas at close proximity with high resolution. Hence, it may detect changes consistent

with chronic pancreatitis in the patient in whom ERCP and other tests are normal. An EUS scope is advanced within the gastrointestinal tract against, or in close proximity to, the pancreas. From a position in the stomach or duodenum, the endoscope allows visualization of the pancreas and adjacent structures (Figure 21C).

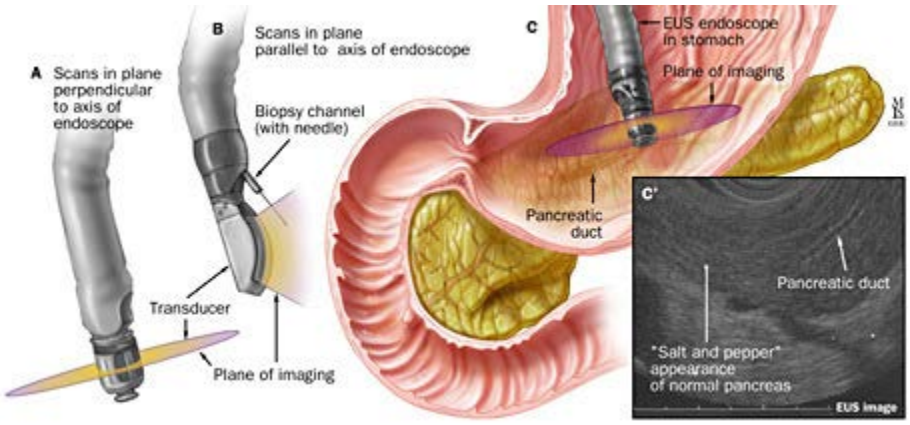


Figure 21. A, Radial and B, linear array EUS scopes; C, in position to scan pancreas; D, corresponding EUS image.

There are two types of EUS scopes: radial scanning (Figure 21A) and linear array (Figure 21B).The radial type scans in a plane perpendicular to the axis of the scope (Figure 21A) to produce 360º images similar to a CT "slice" (Figure 21C and D).The transducer appears as a "bull's-eye within the image (Figure 22).

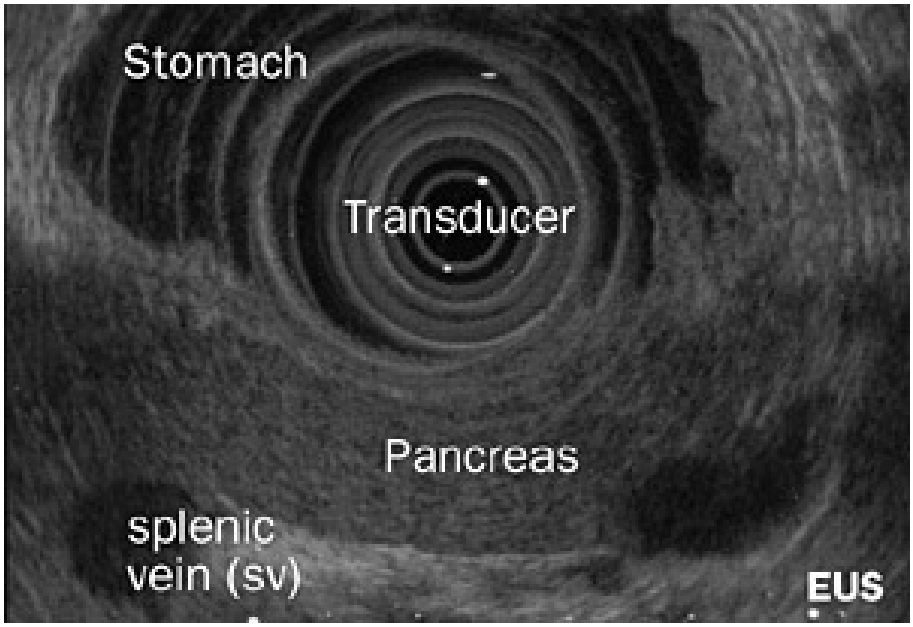


Figure 22. EUS image of a normal pancreas.

The high resolution of the image allows clear differentiation between normal (Figure 23) and diseased ducts (Figure 24). The linear array type (Figure 23) scans in a plane parallel to the axis of the scope. It has the advantage of allowing visualization of the needle while performing a procedure (see Figure 30, EUS celiac plexus block). EUS allows the endoscopist to perform fine needle aspiration of lesions to differentiate malignancies from focal chronic pancreatitis.

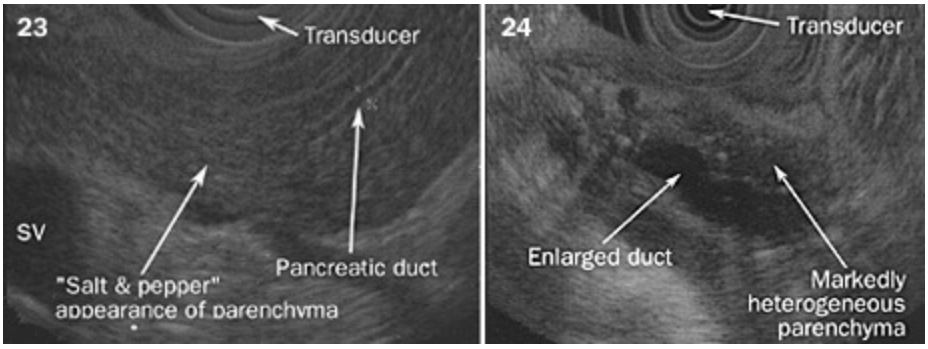


Figure 23, 24. Comparison of EUS of normal pancreas and EUS of chronic pancreatitis.

Therapy

Overview

Chronic pancreatitis patients require supportive measures. The initial stage in management of patients with chronic pancreatitis should include assessment of the etiology and severity of the disease, because both of these factors affect the mode of treatment. Treatment is generally directed toward control of pain, correction of problems related to pancreatic exocrine and endocrine insufficiency, and the correction of associated biliary tract and gastrointestinal tract pathology .

Abdominal pain is a difficult symptom to treat in chronic pancreatitis. Because pain is a subjective sensation, there is no objective parameter for measurement or means to monitor its occurrence.

Medical Therapy

Alcohol and Cigarette Smoking

Avoidance of alcohol ingestion decreases the frequency and the severity of abdominal pain. Cigarette smoking has been correlated with intraductal calcifications in chronic pancreatitis patients. Also, both alcohol and cigarette smoking correlated significantly with number of pain relapses. Patients with chronic pancreatitis should be advised to avoid cigarettes and alcohol.

Analgesics

Non-narcotic analgesics (salicylates, acetaminophen, ibuprofen and nonsteroidal analgesics) should be used initially for pain control. These drugs should be used before meals to prevent postprandial exacerbation of pain. Dosage should be individualized, beginning with the lowest effective dose. With increased severity of pain,dosing frequency and strength should be increased. Episodes of severe abdominal pain may require limited use of narcotic analgesics such as acetaminophen with codeine. Opiate analgesics are required in severe cases of chronic pancreatitis. The pain of chronic pancreatitis is usually intermittent and postprandial, but when pain becomes persistent, affecting the patient's lifestyle, effective pain management becomes the most crucial part of treatment.

Enzyme Therapy

The therapeutic goal of pancreatic enzyme therapy is to control diarrhea and help the patient to gain body weight. Many physicians advocate the use of pancreatic enzymes with acid suppression to inhibit pancreatic secretion and possibly decrease pancreatic intraductal pressure, and lessening pain. Enzyme therapy in chronic pancreatitis is critical for management of malabsorption problems. Diarrhea symptoms significantly improve with oral pancreatic enzyme therapy (with at least 24,000–32,000 units of lipase), but complete correction of steatorrhea is sometimes difficult to achieve, even with large amounts of enzyme supplementation. The clinical usefulness of pancreatic enzymes may be assessed by the patient's weight, ideally gaining two pounds each week and stabilizing at 10% below ideal body weight.

Treatment of Malnutrition

A result of maldigestion and malabsorption of fats, carbohydrates and proteins, protein energy malnutrition is a frequent abnormality in patients with chronic pancreatitis. Therapy for protein energy malnutrition requires correction of malabsorption, and administration of high-protein, high-calorie diets. In severely malnourished chronic pancreatitis patients, total parenteral nutrition may be the preferred treatment. The pancreas is nutrition-sensitive;

consequently, malnutrition may lead to atrophy or fibrosis. Medium-chain triglyceride preparations are a good source of lipid calories for this group of patients. However, nausea and unpleasant taste frequently limit its use.

Surgical Therapy

The progression of chronic pancreatitis is not always predictable, but typically the disease can be characterized by intractable abdominal pain, a state of exhaustion resulting from lack of food and water, chronic depression, and often chemical dependency. Although the malabsorption and diabetes mellitus associated with chronic pancreatitis can be treated medically, intractable pain ultimately becomes a major surgical indication in approximately one-third of patients. There is controversy over the role and timing of surgery in management of the patient with chronic pancreatitis. Early intervention is recommended to prevent irreversible functional impairment of the pancreas. Because the surgery is not uniformly successful and there is a significant recurrence of symptoms, others advocate expectant therapy.

There is no single surgical procedure uniformly recommended for all patients with chronic pancreatitis. The surgical procedure is selected according to the severity of pain, ductal morphology, the extent of parenchymal disease, and the overall condition of the patient. The goal of surgery in chronic

pancreatitis patients is to relieve intractable pain while preserving endocrine and exocrine functions of the pancreas. The results of surgical procedures are inconsistent in their ability to control pain.

The Puestow Procedure

The longitudinal pancreaticojejunostomy, or Puestow's procedure, is the prototypic drainage procedure for patients with marked dilation of the main pancreatic duct (greater than 7–8 mm). An 8–10-cm segment of the pancreatic duct is unroofed and intraductal concretions removed (Figure 25A). The jejunum is divided (Figure 25B) and the opened pancreatic duct is anastomosed to the jejunum (Figure 25C). This allows adequate drainage to enter the jejunum. A jejunojejunostomy reconnects the jejunum to restore continuity of the gastrointestinal tract (Figure 25D). This procedure is successful in relieving pain in 70–80% of patients in the short term. Pancreatic function remains unchanged because there has not been resection of the gland. It is a safe and effective surgery with low morbidity and mortality.

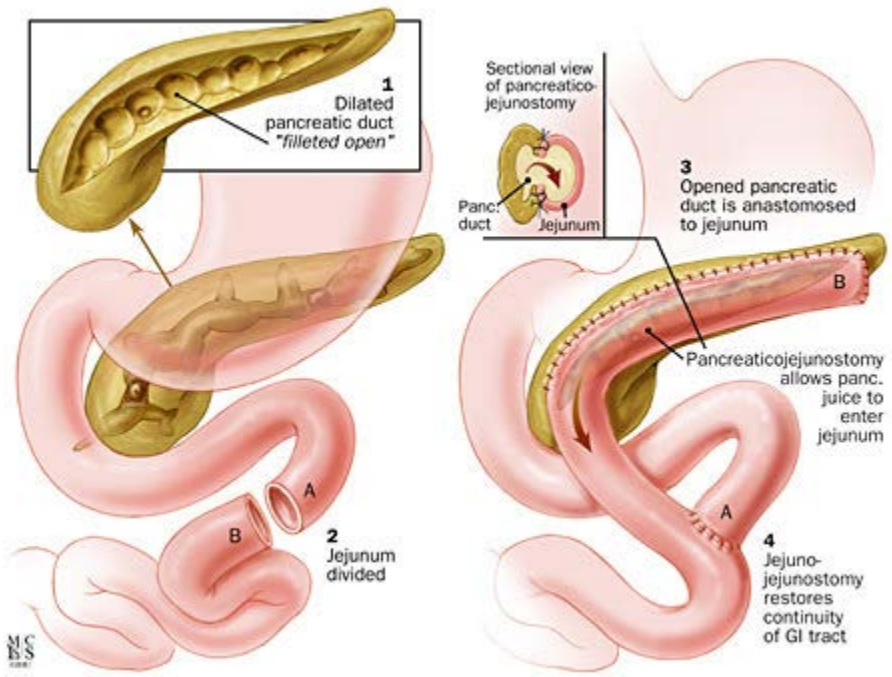


Figure 25. The Puestow procedure.

FREY'S PROCEDURE

Local Resection of the Head of the Pancreas with Longitudinal Pancreatico-Jejeunostomy

In 1987 the local resection of the head of the pancreas combined with longitudinal pancreatico-jejunostomy (LRLPJ)was described by Frey and Smith [69] (Fig. 4). The operation combined features of Child's 95% distal pancreatectomy in the head of the pancreas (with whom Frey worked while at the University of Michigan) and the longitudinal pancreatico-jejunostomy of Puestow. In 1994, after an average follow-up of 3½ years, the results of 50 cases were reported [70]. Pain was relieved in 80% of the patients and exocrine

and endocrine insufficiency followed the natural history of chronic pancreatitis and did not seem to be affected by the operation.The operation was designed to remove most of the head of the pancreas (the so-called pacemaker of the disease)while preserving the body and tail of the pancreas, the stomach, and duodenum to minimize morbidity. Although drainage of the main pancreatic duct in the body and tail of the gland is usually performed because of the presence of post-stenotic dilatation and ductal stones, it may not be an essential part of the procedure if the main duct in the body and tail is open and uninflammed throughout its length. This“coring” of the pancreatic head with preservation of the posterior capsule is the essential feature of the LR-LPJ operation. It can be performed safely using the ultrasonic dissector and aspirator [71] (Fig. 5), or with a combination of suture plication and cautery. As with the DPPHR, it is important to recognize and preserve the intrapancreatic common bile duct.The DPPHR described by Beger has similarities to the LR-LPJ. Both are directed primarily at the disease in the head of the pancreas and both preserve gastrointestinal continuity. Not surprisingly, the results of both operations in terms of pain relief and quality of life appear to be similar. These 2 operations also have significant differences.The posterior capsule of the pancreas is preserved in the LR-LPJ, which allows the excavated

head(and dorsal duct) to be drained into a single, side-to-side pancreatico-jejunostomy. The DPPHR does not preserve the posterior capsule, which mandates 2 anastomoses.The Beger operation requires that the pancreas be divided at its neck overlying the superior mesenteric and portal vein. In the event of portal hypertension and associated inflammatory changes, this may be technically difficult,but is avoided in the LR-LPJ

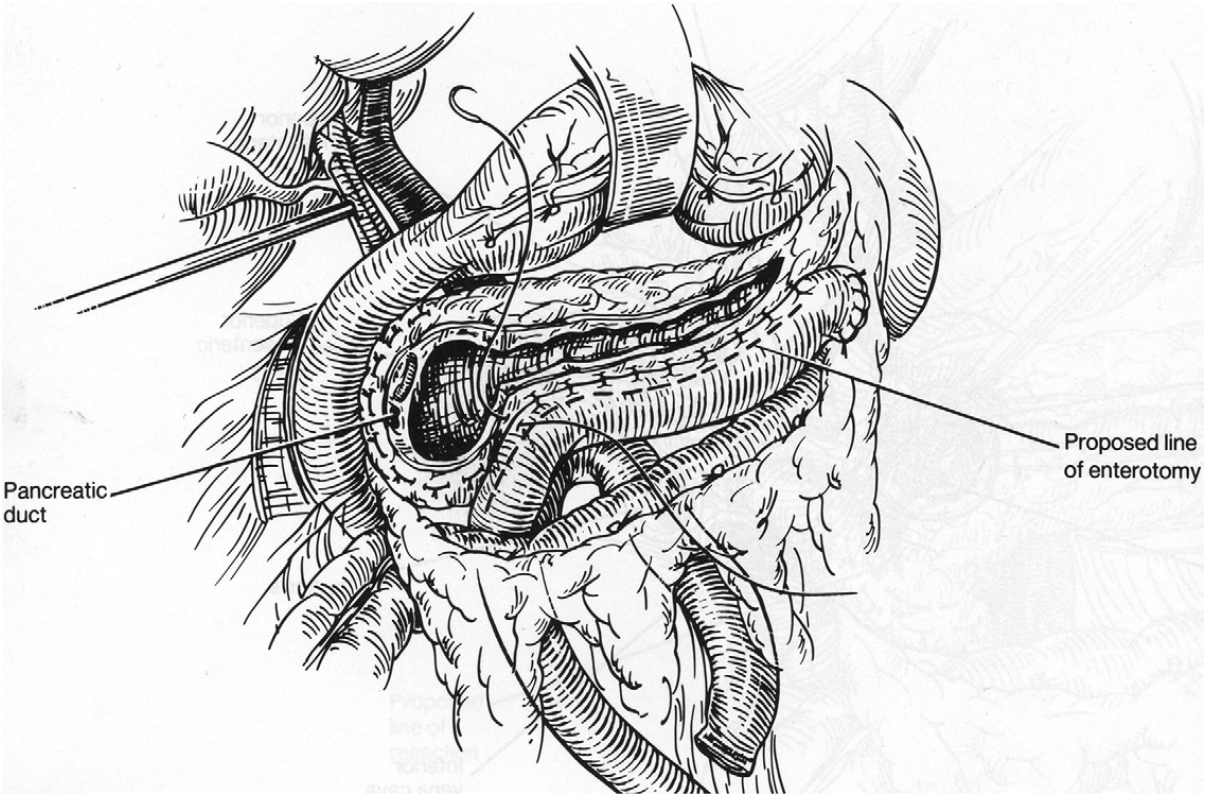


Fig. 4. Local resection of the pancreatic head with longitudinal pancreatico-jejunostomy (LR-LPJ) or Frey procedure. The extended longitudinal Roux-en-Y pancreatico-jejunostomy with excavation of the pancreatic head provides complete decompression of the distal ductal system as well as removal of the nidus of chronic inflammation.

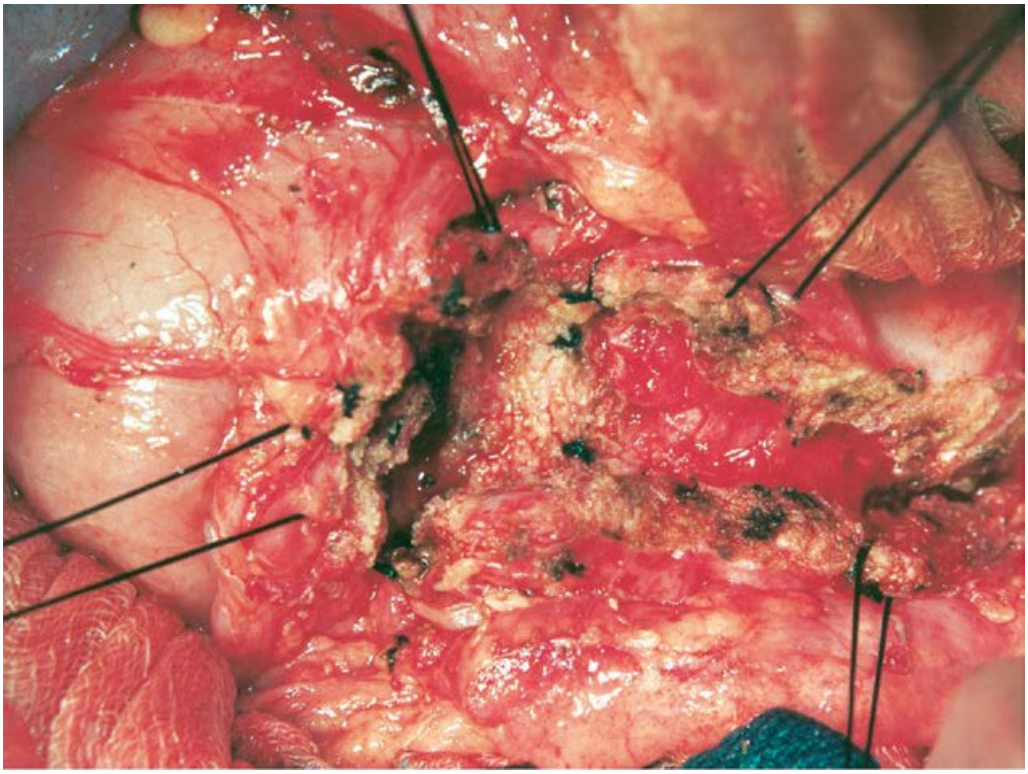
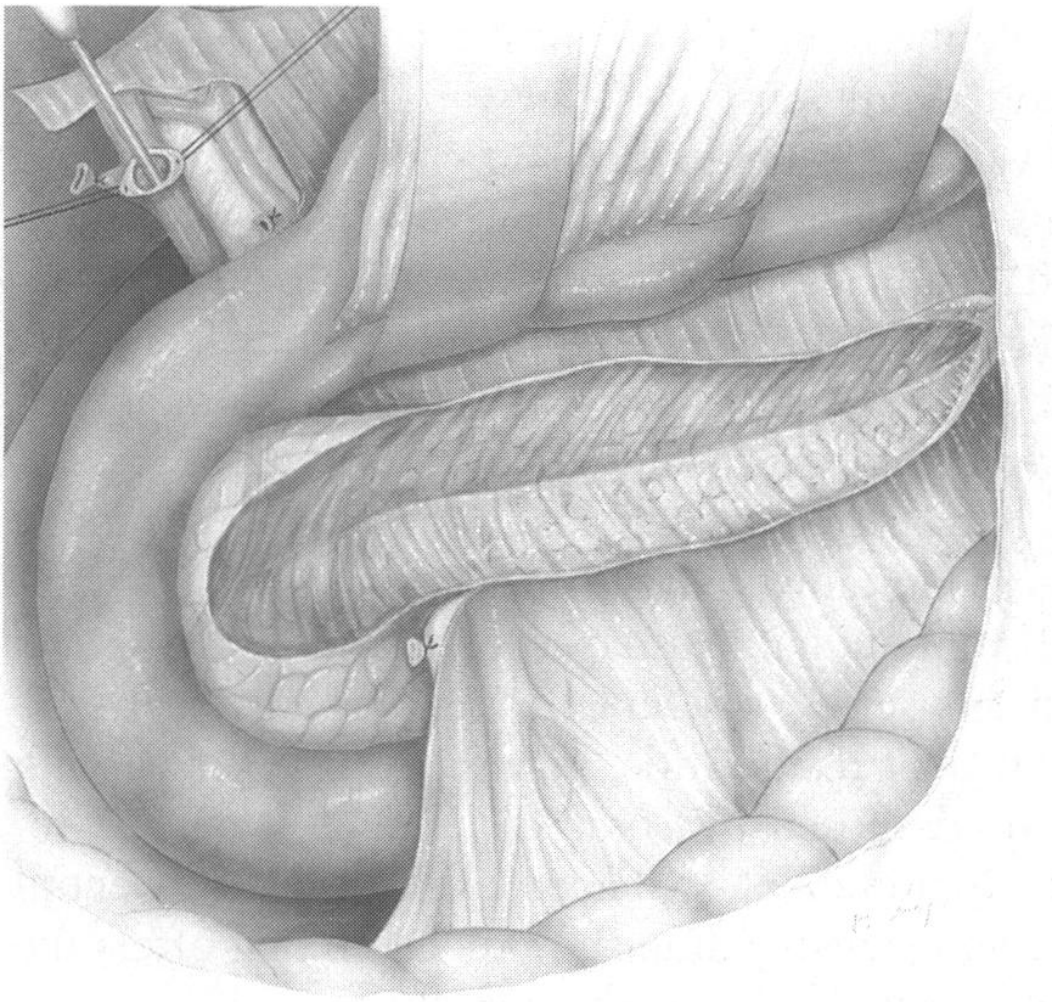


Fig. 5. Operative photograph of a completed excavation of the pancreatic head using the ultrasonic aspirator and dissector. Note the complete removal of the proximal ductal systems with preservation of the posterior pancreatic capsule. The longitudinal pancreatotemy reveals chronic inflammation of the ductal mucosa in the body and tail, consistent with recurrent inflammation due to chronic pancreatitis.

Izbicki's ''V'' shaped ventral pancreatic excision

In this procedure a long ''V'' shaped excision of ventral aspect of the pancreas is done with a lateral pancreaticojejunostomy by a mucosa to capsule anastamosis. This procedure drains the main as well as the second and third order ducts.This is an ideal procedure for small duct disease with a maximum diameter of the Wirsung's duct less than 3mm. In small duct chronic pancreatitis, longitudinal V-shaped excision of the ventral pancreas is a safe and effective alternative to resection procedures. The new technique provides

pain relief and improvement of quality of life, thus offering the benefit of a resection procedure without its burden.



MATERIALS AND METHODS

TITLE

A COMPARITIVE STUDY OF DRAINAGE PROCEDURES IN CHRONIC PANCREATITIS.

Source of Data:

All cases of CHRONIC PANCREATITIS who attend govt. mohan kumaramangalam medical college hospital, will be evaluated clinically and by investigations and will be included in the study from may 2013 to march 2015.

Sample size:

Sample size of minimum of 32 patients fulfilling the inclusion criteria were part of this study.

Method of Collection of Data:

- Detailed history taking
- Complete clinical examination
- Investigations
- Performing surgery for the cases, noting the findings and follow up of the
- relief of symptoms and improvement of quality of life .
- The details of the above have been given in the clinical proforma sheet and in the master chart.

STUDY DESIGN

Prospective cross sectional study

STUDY PERIOD

2 years (May 2013 to march 2015)

PLACE OF THE STUDY

Govt. Mohan Kumaramangalam Medical College Hospital, Salem.

ETHICAL CLEARANCE

Institutional Ethical clearance obtained

Inclusion criteria:

- **Clinical & Radiological features of Chronic pancreatitis with persistent pain.**
- **Pancreatic ductal dilatation**
- **severe malabsorption**
- **multiple relapse**
- **Pseudocyst pancreas**

Exclusion criteria:

- **Patients unfit for prolonged anaesthesia**
- **Pseudoaneurysm**
- **Infected Pseudocyst**
- **Pancreatic malingnancy**

- **Periampullary carcinoma with pancreatitis**
- **Acute exacerbation of chronic pancreatitis**
- **Patients not willing for follow up**

STUDY METHODOLOGY

Patients who met inclusion and exclusion criteria for the study selected and all patients informed about the nature of the disease and possible complications (infection , wound dehiscence, persistent symptoms, post operative pain) expected after surgery. Written consent for the study and surgery obtained.

In proforma, thorough history, signs and symptom, clinical findings noted.

- Blood glucose and urea,
- Serum creatinine and electrolytes,
- Complete Blood count
- Urine routine examination
- X ray chest PA view
- ECG in all leads
- cardiology fitness

Specific investigations

- x ray Abdomen AP erect

- Transabdominal Ultrasonography

- Contrast Enhanced Computed Tomography

- Magnetic Resonant Cholangiopancreaticography

- ERCP

- EUS

PRE OPERATIVE PREPARATIONS

* NPO for about 24 hrs before surgery,

* consent for planned procedure

* Abdomen prepared on the previous day of surgery

* Inj. Cefotaxime 1 gm IV before surgery

* Inj. Ranitidine 50mg IV before surgery

* Inj. TT 0.5cc IM

* Inj. Xylocaine test dose

PROCEDURES DONE

1. FREY'S PROCEDURE,
2. PUESTOW GILLESBY PROCEDURE &
3. IZBICKE'S PROCEDURE

In our study cases of which 14 cases selected for FREY'S PROCEDURE, 10cases for PUESTOW GILLESBY PROCEDURE, and 8 cases IZBICKE'S PROCEDURE done.

- All cases done under general anesthesia.

- All cases are done in supine position.

- All cases are done in ROOF TOP incision.

- All cases pancreaticojejunostomy and Roux en-y and jejunojejunostomy done.

- Head coring done in FREY'S PROCEDURE.

- B/L Flanks drain kept.

POST OPERATIVE EVENTS

Patients were shifted to the ward and adequate analgesics and antibiotics were given. Oral fluids were started after 5 of surgery. Dressing was changed on second post operative day. Normal diet was started from 7 th post operative day or as tolerated by the patients.Drains removed on 8 th pod after confirming that there is no anastomotic leak. If patients improved clinically, they were discharged and advised to attend surgical OPD for regular follow up.

ASSESSMENT TOOLS

Per operative complications

* Intra operative Bleeding due to adhesions

* Difficulty in identifying the main pancreatic duct

* Duration of surgery

Post operative complications

- ❖ post operative Bleeding
- ❖ post operative pain
- ❖ wound infection
- ❖ Collection
- ❖ wound dehiscence
- ❖ Control of blood sugar
- ❖ Anastamotic leak

Complications on follow up

- Recurrence of symptoms
- uncontrolled Diabetics
- malnourishment
- Poor quality of life

RESULTS

The patients presenting to the doctor for complaints relating to chronic pancreatitis only represent the tip of the ice berg. Many go unreported and under diagnosed or even misdiagnosed. A total of 32 patients were admitted with complaints relating to chronic pancreatitis and its complications. The above patients were included in the study, findings noted, appropriate treatment instituted and followed up for a period of 6months.

The study titled, " **A COMPARITIVE STUDY OF DRAINAGE PROCEDURES IN CHRONIC PANCREATITIS**" was conducted at GOVERNMENT MOHANKUMARAMANGALAM MEDICAL COLLEGE, SALEM from which the following observations are done

1. Age and Gender distribution of the Study Population.

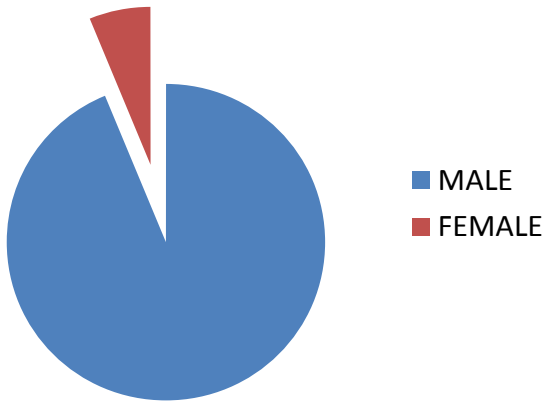
In this study more than two third of the patients (68.2%) were less than 40 years old. The Mean Age of the studied population was 34.8 ± 4.54 with minimum age being 32 and maximum age being 53 years

In this study majority (93.4%) of the study population was Males and Females consisted of only a few (6.6%). The male: female ratio was noted to be approximately 15:1 in this study.

Table No. 01: Age and Gender distribution of the Study Population.

Variable	Frequency	Percent
Gender		
Male	30	93.75
Female	2	6.25
Total	32	100.0

Graph No. 01: Gender distribution of the Study Population.



Age Groups		
< 25 Years	1	3.12
25 – 30	4	12.50
30 – 35	9	28.13
> 35 years	18	56.25
Total	32	100.0

Graph No. 02: Age Distribution of the Study Population.

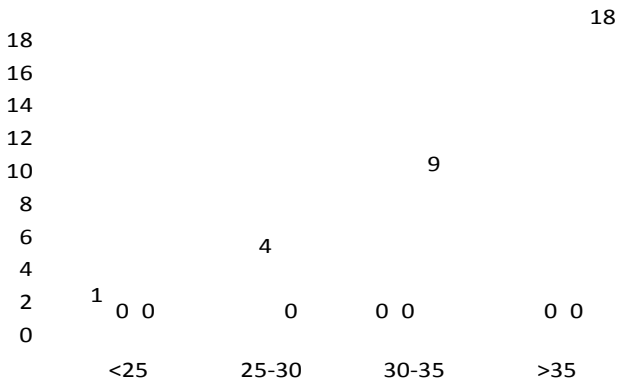
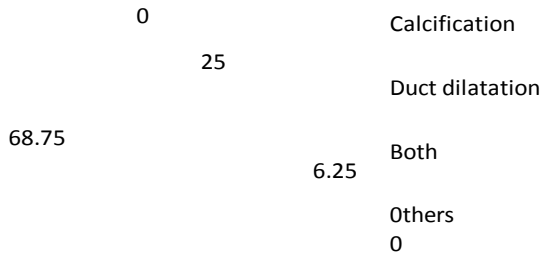


Table No. 03:CECT findings in the patients.

Findings	Frequency	Percent
Duct and parenchymal caicification only	8	25
Main pancreatic duct dilatation only	2	6.25
Both findings	22	68.75
Total	32	100.0

Graph No. 03:CECT findings in the patients.



04.Disribution of the patients based on the type of treatment procedure Performed.

The patients were managed by one of the three procedures namely .

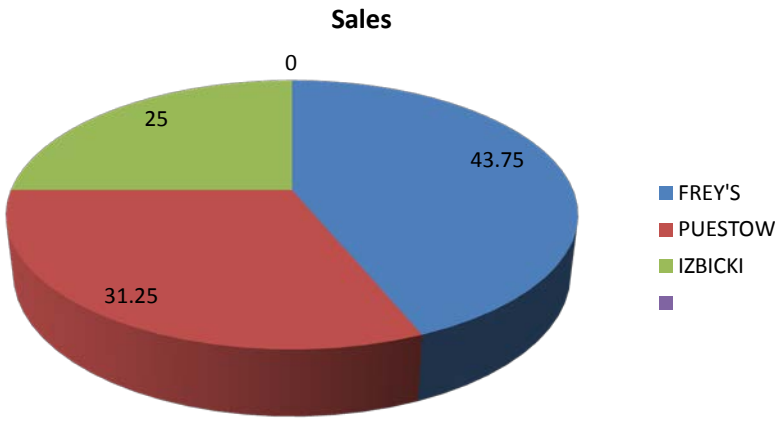
1. FREY'S PROCEDURE,
2. PUESTOW GILLESBY PROCEDURE &
3. IZBICKE'S PROCEDURE.

Out of 32 patients 14 patients underwent . FREY'S PROCEDURE, 10 patients underwent. PUESTOW GILLESBY PROCEDURE and 8 patients underwent IZBICKE'S PROCEDURE.

Table no.4 Distribution of the patients based on the type of treatment procedure Performed.

Procedure	Frequency	Percent
FREY'S PROCEDURE	14	43.75
PUESTOW GILLESBY PROCEDURE	10	31.25
IZBICKE'S PROCEDURE.	8	25
TOTAL	32	100.0

Graph No. 04: Disribution of the patients based on the type of treatment procedure Performed.



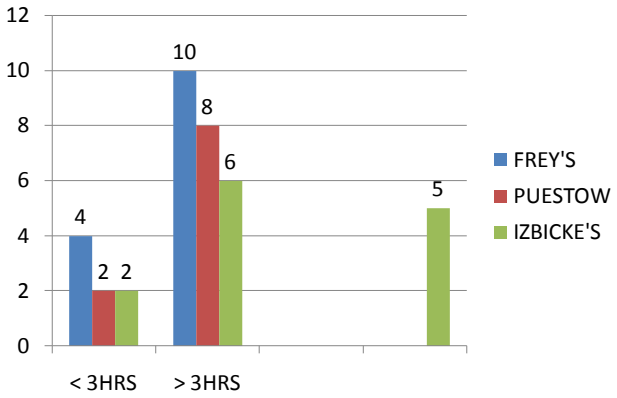
05. Distribution of the Patients on the basis of duration of Surgery.

It was observed that the time taken for operating on the patients was more than three hours in all the patients treated surgically for chronic pancreatitis. In contrast, frey's procedure required greater time of more than half hour for performance of coring of the head. Highly significant statistical association was observed between the duration of surgery and the treatment groups. The mean duration of surgery was highest among Frey's procedure treatment group followed by Izbicke's procedure and Puestow procedure.

Table No. 05: Distribution of the treatment groups based on the duration of Surgical Procedure Performed

Variable	Treatment Procedure			Total	p-value
	Frey's	Izbicke's	Puestow		
<3 Hour	4	8	6	18	
	22.2%	44.4%	33.3%	100.0%	
	28.6%	80%	75.0%	56.25%	
>3 Hour	10	2	2	14	
	71.6%	14.2%	14.2%	100.0%	
	71.4%	20.0%	25%	43.75%	0.00
Total	14	10	8	32	
	43.75%	31.25%	25.0%	100.0%	
	100.0%	100.0%	100.0%	100.0%	
Mean	42.5	57.25	93	60.68	
S.D	4.27	6.58	4.21	19.6	

Graph No.05: Distribution of the Treatment Groups based on the Duration of Surgical Procedure Performed



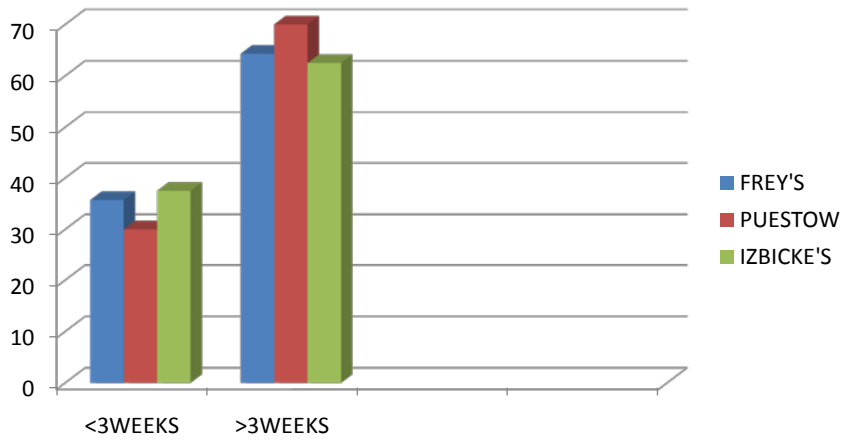
06. **Distribution of the Patients on the basis of duration of Hospital Stay.**

It can be seen that nearly all of the patients treated by surgically had a hospital stay of more than three weeks duration.one week for preop evaluation and planning and two weeks for post op care.If the patient develops any post op complication like wound infection the hospital stay will prolong one more week.All the three groups treated by three different surgical procedures had the same duration of hospital day.The association between the duration of hospital stay and type of treatment procedure performed was not statistically not significant.

Table No. 06: Distribution of the Patients on the basis of duration of Hospital Stay.

Duration of Hospital stay	FREY'S (14)		PUESTOW (10)		IZBICKE'S (8)	
	No Of Cases	%	No Of Cases	%	No Of Cases	%
< 3 Week	5	35.7	3	30	3	37.5
>3Weeks	9	64.3	7	70	5	62.5

Graph No.06 Distribution of the Treatment Groups and their Durationof



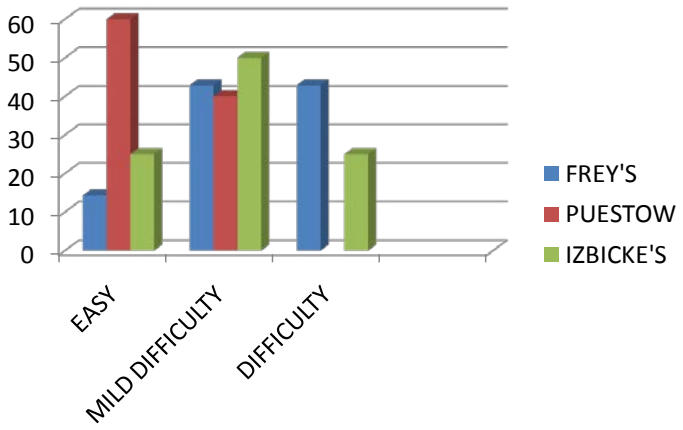
7. Distribution of the Study Groups on the Basis of the type of Treatment Procedure and Ease of Performance of Procedure.

The surgeon perceived that it was easy to perform in 85.7% and 90% of the patients treated by Puestow procedure. Whereas it was little difficult to perform Frey's procedure and Izbicke's procedure all the patients treated with such technique. This difference in the difficulty perception of the surgeon and the surgery technique was found to be statistically significant.

Table No. 07: Distribution of the Study Groups on the Basis of the type of Treatment Procedure and Ease of Performance of Procedure.

Ease of Procedure	Treatment Procedure			Total	p-value
	Frey's	Puestow	Izbicke's		
Easy	2	6	2	10	0.00
	20.0%	60.0%	20.0%	100.0%	
	14.3%	60%	25%	31.25%	
Mild Difficult	6	4	4	14	
	42.8%	28.6%	28.6%	100.0%	
	42.9%	40.0%	50.0%	9.1%	
Difficult	6	0	2	8	
	75.0%	0%	25.0%	100.0%	
	42.9%	0%	25.0%	22.7%	
Total	14	10	8	32	
	43.75%	31.25%	25%	100.0%	
	100.0%	100.0%	100.0%	100.0%	

Figure No. 07: Distribution of the Study Groups on the Basis of the type of Treatment Procedure and Ease of Performance of Procedure.



8.Proportion of patients among the Treatment groups experiencing Complications in the Per-operative Period, Post-operative Period and Follow up Period.

Per operative complications were reported in larger number of patients undergoing Izbicke's procedure (21.4%) followed by Frey's procedure (20%) and Puestow's procedure(15%). Post operative complications were observed equally in by Frey's procedure and Puestow's procedures and more in Izbicke's procedure. Recurrence was observed in Puestow's procedure but not in Frey's procedure and Izbicke's procedure.

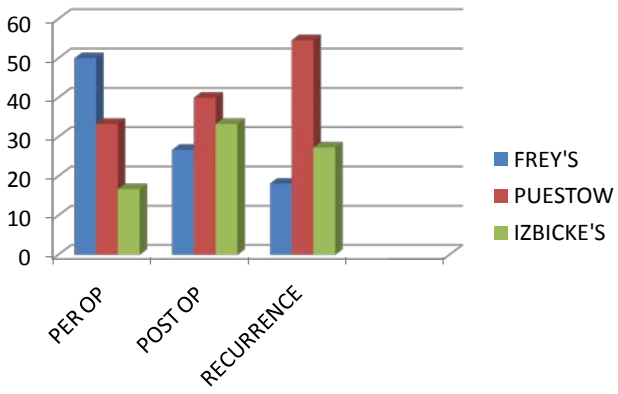
Table No. 08: Proportion of patients among the Treatment groups experiencing Complications in the Per-operative Period, Post-operative Period and Follow up Period.

Variable	Treatment Procedure			Total	p-value
	FREY'S	PUESTOW'S	IZBICKES		
Per-operative Complications					
Absent	8	6	6	20	0.879
	40.0%	30.0%	30.0%	100.0%	
	57.2%	42.9%	75.0%	62.5%	
Present	6	4	2	12	
	50.0%	33.3%	16.7%	100.0%	
	42.9%	40.0%	25.0%	37.5%	
Total	14	10	8	32	
	43.75%	31.25%	25%	100.0%	
	100.0%	100.0%	100.0%	100.0%	
Post-operative Complications					
Absent	10	4	3	17	0.751
	59.8%	23.5%	17.7%	100.0%	
	71.4%	40%	37.5%	53.1%	
Present	4	6	5	15	
	26.7%	40%	33.3%	100.0%	
	28.6%	60.0%	62.5%	46.9%	
Total	14	20	10	44	
	43.75%	31.25%	25%	100.0%	
	100.0%	100.0%	100.0%	100.0%	
Recurrence					
No	12	4	5	21	0.703
	57.1%	19.1%	23.8%	100.0%	

	85.7%	40%	62.5%	65.6%	
Yes	2	6	3	11	
	18.1	54.6%	27.3%	100.0%	
	14.3%	60.0%	37.5%	34.4%	
Total	14	20	10	44	
	43.75%	31.25%	25%	100.0%	
	100.0%	100.0%	100.0%	100.0%	

Graph No. 08:

Proportion of patients among the Treatment groups experiencing Complications in the Per-operative Period, Post-operative Period and FollowupPeriod



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09.Gender Distribution between the Study Population and the Treatment Groups.

Nearly half of the males (45%) were treated with Frey's procedure where as in females, equal number of patients were treated with Frey's procedure and Puestow procedure. Equal number of patients aged less than 35 years was treated with the three treatment procedures, whilst patients aged more than 35 years were treated with Frey's procedure only. More number of patients (45.5%) was treated with Frey's procedure. The association between the gender and age distribution with the type of treatment procedure followed was not statistically significant.

Table No.09: Gender Distribution between the Study Population and the Treatment Groups.

Variable		Treatment Procedure			Total	p-value
		FREY'S	PUESTOW'S	IZBICKES		
Gender						
Male	**Count**	13	9	8	30	0.239
	% within SEX	43.3%	30.0%	26.7%	100.0%	
	% within Treatment Procedure	92.9%	90.0%	100.0%	93.75%	
Female	**Count**	1	1	0	2	
	% within SEX	50%	50.0%	0%	100.0%	
	% within Treatment Procedure	7.1%	10.0%	0%	6.25%	
Total	**Count**	14	10	8	44	
	% within SEX	43.75%	31.25%	25%	100.0%	
	% within Treatment Procedure	100.0%	100.0%	100.0%	100.0%	

Figure No. 09; Gender Distribution between the Study Population and the Treatment Groups.

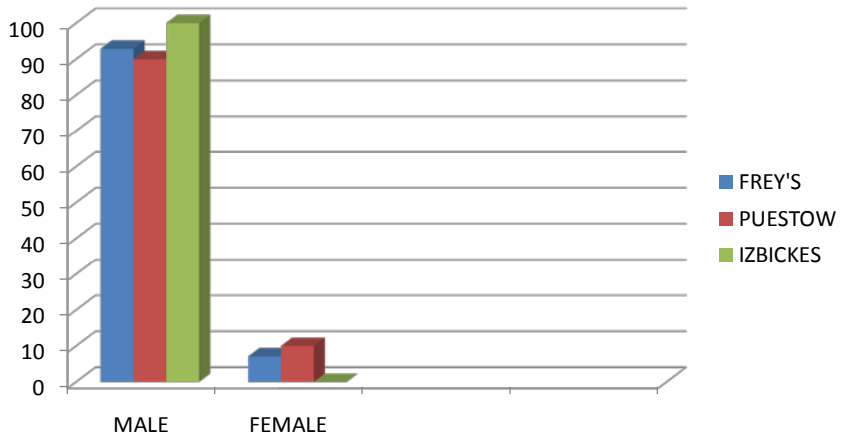
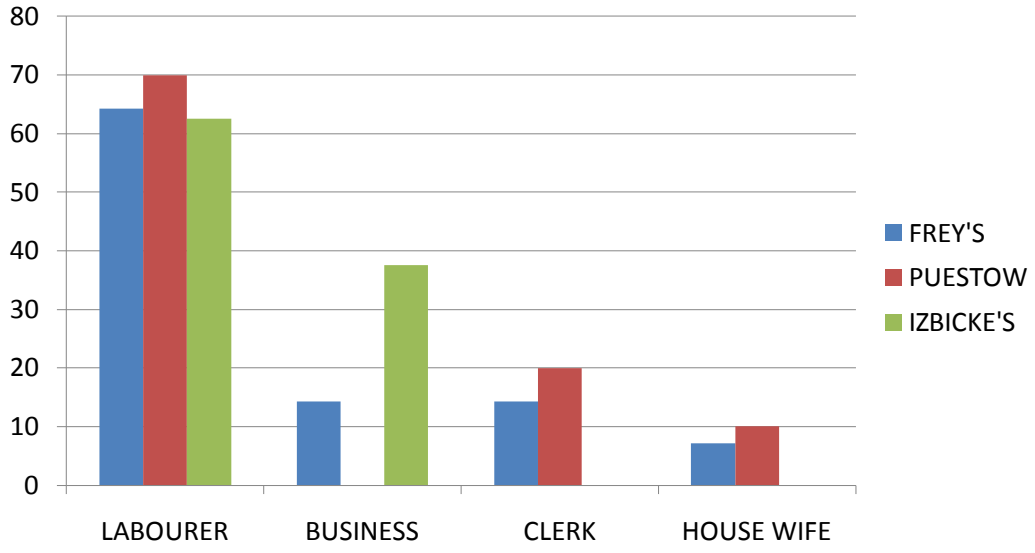


Table No. 10:Distribution of the patients on the basis of their Occupation and Treatment groups.

Variable		Treatment Procedure			Total	p-value
		FREY'S	PUESTOW'S	IZBICKES		
Manual labourer	Count	9	7	5	21	0.927
	% within OCCUPATION	42.9%	33.3%	23.8%	100.0 %	
	% within Treatment Procedure	64.3%	70.0%	62.5%	65.6 %	
Business	Count	2	0	3	5	
	% within OCCUPATION	25%	0%	75%	100.0 %	
	% within Treatment Procedure	14.3%	0%	37.5%	12.5 %	
Clerk/ Executive	Count	2	2	0	4	
	% within OCCUPATION	50.0%	50.0%	0%	100.0 %	
	% within Treatment Procedure	14.3%	20.0%	0%	9.4%	
Others (including house wifes)	Count	1	1	0	2	
	% within OCCUPATION	50.0%	50.0%	0%	100.0 %	
	% within Treatment Procedure	7.1%	10.0%	0%	31.8 %	
Total	Count	14	10	8	32	
	% within OCCUPATION	43.75%	31.25%	25%	100.0 %	
	% within Treatment Procedure	100.0%	100.0%	100.0%	100.0 %	

Nearly half of the Manual labourers were treated with Frey's procedure (42.9%) whilst others were treated with puestow (33.3%) and Izbicke'sprocedures (28.4%). Businessman and clerks/executives were equally treated with all the three procedures.

Figure No. 10: Distribution of the patients on the basis of their Occupation and Treatment groups.



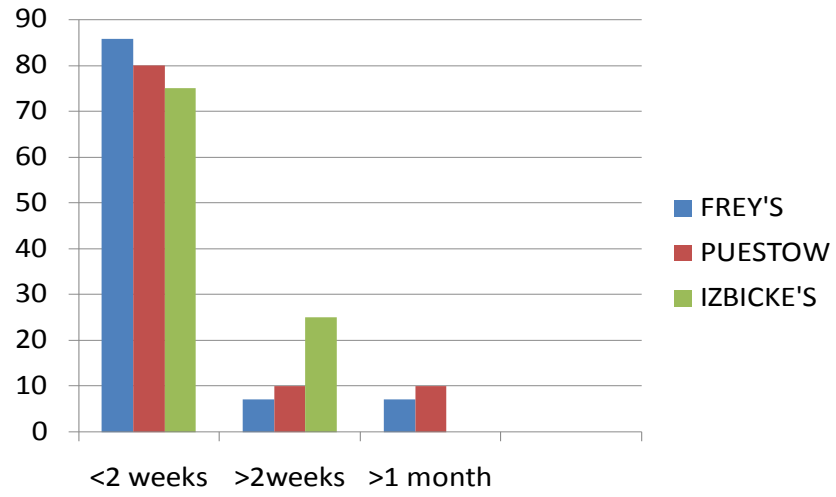
11.Distribution of the Treatment Groups and Time taken for complete Wound Healing.

Table No.11: Distribution of the Treatment Groups and Time taken for complete Wound Healing.

Variable	Treatment Procedure			Total	p-value
	FREY'S	PUESTOW'S	IZBICKES		
< 2Weeks	12	8	6	26	0.00
	46.2%	30.8%	23.0%	100.0%	
	85.7%	80.0%	75.0%	81.3%	
>2Weeks	1	1	2	4	
	25.0%	25.0%	50.0%	100.0%	
	7.2%	10.0%	25.0%	9.1%	
> 1Months	1	1	0	2	
	50.0%	50.0%	0.0%	100.0%	
	7.1%	10.0%	0.0%	4.6%	
Total	14	10	8	32	
	43.75%	31.25%	25%	100.0%	
	100.0%	100.0%	100.0%	100.0%	
Mean	67.57	12.45	20.90	31.91	
S.D	10.18	4.25	4.31	25.72	

Most of the Patients treated by all the three procedures took lesser duration for complete wound healing (Less than two week. It was observed that there is no difference between the all the three procedures.

Figure No. :11. Distribution of the Treatment Groups and Time taken for complete Wound Healing.



POSTOPERATIVE PAIN ASSESMENT BY VISUAL ANALOGUE SCORE

A Visual Analogue Scale (VAS) is a measurement instrument that tries to measure a characteristic or attitude that is believed to range across a continuum of values and cannot easily be directly measured. For example, the amount of pain that a patient feels ranges across a continuum from none to an extreme amount of pain. From the patient's perspective this spectrum appears continuous ± their pain does not take discrete jumps, as a categorization of none, mild, moderate and severe would suggest. It was to capture this idea of an underlying continuum that the VAS was devised.Operationally a VAS is usually a horizontal line, 100 mm in length, anchored by word descriptors at each end. The patient marks on the line the point that they feel represents their perception of their current state.

The VAS score is determined by measuring in millimetres from the left hand end of the line to the point that the patient marks.

PAIN SCORE (N = 32 PATIENTS)					
CRITERION	PREOPERATIVE SCORE (MEDIAN RANGE)	POSTOPERATIVE FOLLOW UPSCORE (MEDIAN RANGE)			P VALUE
		FREY'S PROCEDURE	PUESTOW'S PROCEDURE	PREOPERATIVE SCORE	
Pain visual analog Scale	81	6	16	12	P<0.01
Frequency of pain Attacks	75	0	4	2	P<0.01
Pain medication	17	0	4	2	P<0.01
Inability to work	75	0	10	6	P<0.01
Pain score*	62	2	10	6	P<0.01

* The pain score was defined as the sum of the rank values of the four criteria divided by four;

Occupational rehabilitation was achieved in 21 of 32 patients (65%).

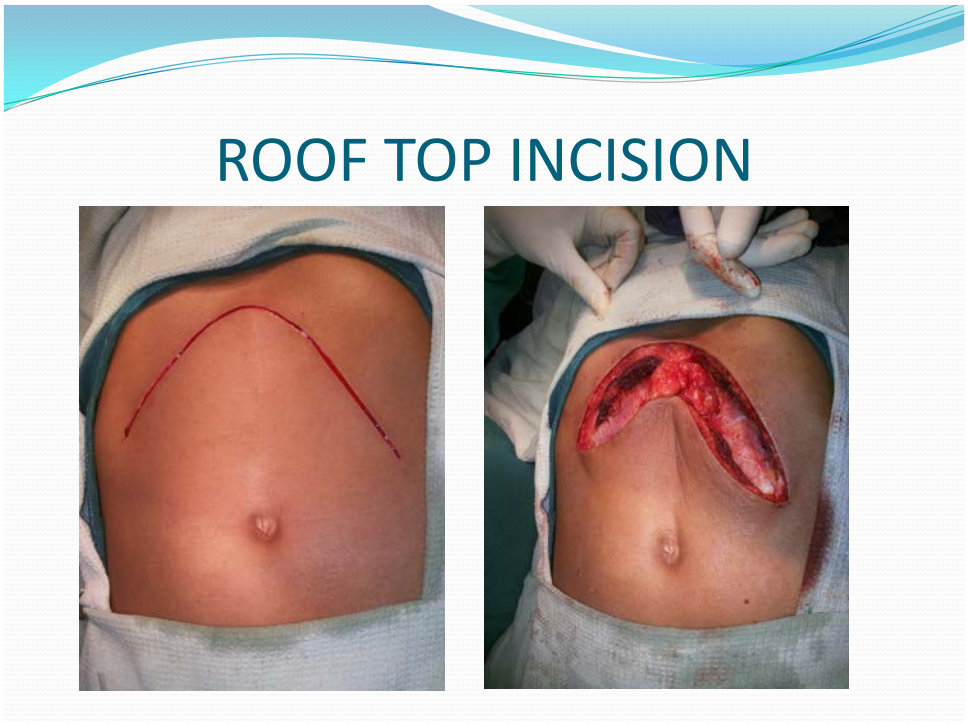
QUALITY OF LIFE ASSESSMENT: FUNCTION SCALES (N = 32 PATIENTS)					
FUNCTIONAL SCALES	PREOPERATIVE SCORE	POSTOPERATIVE SCORE			P VALUE
		FREY'S PROCEDURE	PUESTOW'S PROCEDURE	IZBICKE'S PROCEDURE	
Physical status	60	100	80	82.6	P<0.01
Working ability	50	100	84.8	86	P<0.01
Cognitive functioning	50	66.7	62.2	65.8	P<0.01
Emotional functioning	25	75.0	65.8	72.6	NS
Social functioning	16.7	66.7	60.6	64.8	P<0.01
Global quality of life	28.6	85.7	75.8	80.6	NS

NS = not significant.

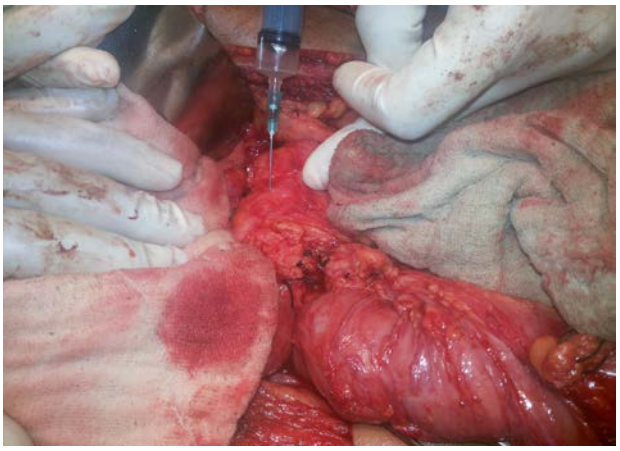
* Statistical analysis: Wilcoxon rank test.

Occupational rehabilitation was achieved in 21 out of 32 patients (65%).

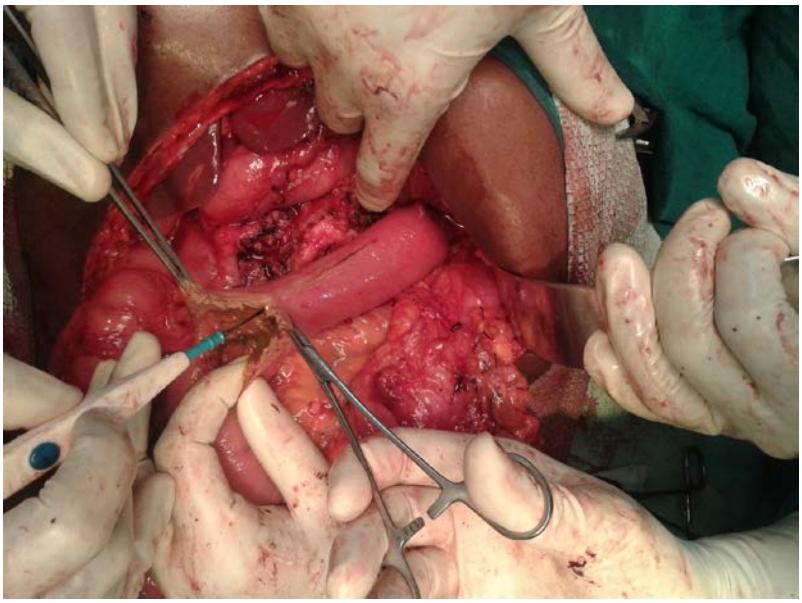
PEROPERATIVE PICTURES



IDENTIFYING THE PANCREATIC DUCT

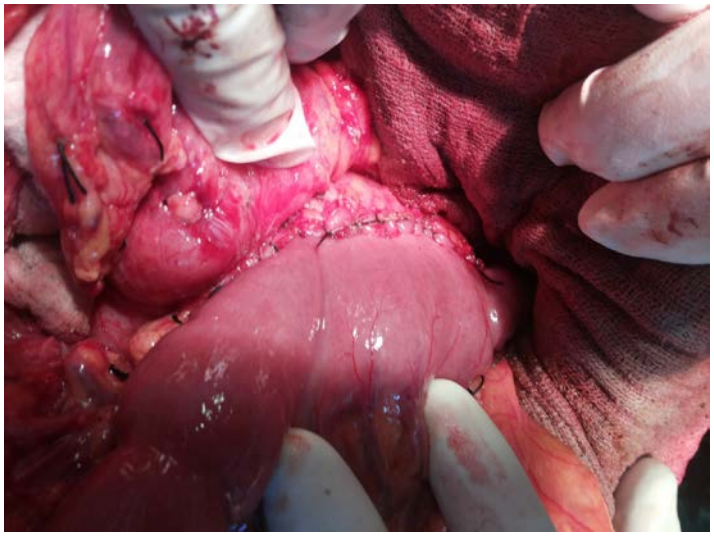


OPENING THE JEJUNUM

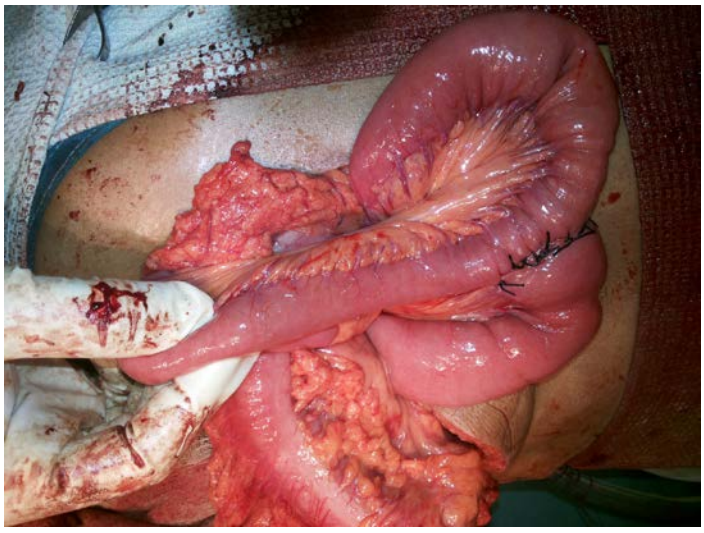


LONGITUDINAL PANCREATICOJEJUNOSTOMY

SIDE TO SIDE PANCREATICO JEJUNOSTOMY



END TO SIDE JEJUNO-JEJUNOSTOMY



DISCUSSION

Chronic pancreatitis is a progressive inflammatory disorder characterized by irreversible destruction of pancreatic parenchyma and may be associated with disabling chronic pain and permanent loss of endocrine and exocrine function. Main indication for surgery is intractable abdominal pain and choosing the best technique to be used for a patient remains a challenge.

Sex incidence

The disease is more common in males than females for reasons like Alcoholism, smoking and occupation. The western literature also confirms that this disease is predominant in males. The Indian male for obvious reasons like Alcoholism, smoking and occupation were noted to be more prone for the disease than the female counterpart. In this study majority (93.75%) of the study population was Males and Females consisted of only a few (6.25%). The male: female ratio was noted to be approximately 15:1 in this study.

Age incidence

The disease occurs rarely in subjects beyond 50years for reasons that have already been explained. It is more commonly seen in the age groups of 30 to 40 years because the time taken for the manifestation of the disease is high. Females tend to develop this disease at an earlier age than the male counterparts because the etiology is different in females compare to males.

In this study more than two third of the patients (81.38%) were between the age group of 30 to 40 years. The Mean Age of the studied population was

6.8 ± 4.54 with minimum age being 24 and maximum age being 51 years, which is comparable with, other standard studies namely.

Occupation incidence

Occupation has an important role in the development of chronic pancreatitis. It's seen in people who are manual labourers who are more for chronic alcoholism and smoking to overcome the stress and strain from their prolonged work.. In this study nearly 2/3 rd (75.0%) of the patients were manual iabourers by occupation. businessman consisted of about 12.5% of the population.

Body Mass Index

Most of the patients presented with chronic alcoholism are malnourished due to loss of appetite and exocrine and endocrine deficiency. Over weight and obesity are considered to be less contributing factor.

Investigation

Diagnosis of chronic pancreatitis is mostly clinical and by radiological imaging. There specific investigations that are needed for the confirmation of endocrine and exocrine deficiency are available.x ray abdomen, ultrasound abdomen,CECT Abdomen, MRCP are routinely done in these patients to know the duct and parenchymal calcification,duct diameter, and to rule out CBD and Gallbladder pathology.

Treatment

Among the 32 patients,14 patients underwent FREY'S PROCEDURE, 10 patients underwent PUESTOW PROCEDURE and 8 patients underwent

IZBICKE;S PROCEDURE.All the patients treated with B/L flank drains and kept on nil oral for 5 days.Drains were removed on 7th POD after confirming that there is no anastomotic leak.All are given IVantibiotics for 7 days.

Nearly half of the males (43.3%) were treated with Frey's procedure and 30% of males treated with Puestow procedure. where as in females, equal number of patients were treated with Frey's procedure and Puestow procedure.

Time taken for surgery

Average time taken for Puestow and Izbicke's procedure were 3 hours. Extra 30 to 45 minutes were taken for Frey's procedure in which the head coring has to be done.This time includes from time of induction to recovery of the patient from Anaesthesia.

Complications

Per operative complications mainly excessive bleeding noted in more number of patients with previous abdominal surgeries with adhesions.In other cases the dissection was easy and there was no significant per operative complications.

In few cases post op wound infection occurred which was treated with appropriate antibiotics and dressings and allowed to heal by secondary intention.

Post operative diabetic management was difficult in most of the cases for which Diabetologist opinion obtained and Insulin was given.Nutrition support was given to most of the patients.

Duration of hospital stay

It can be seen that more than half of the patient (65.6%) treated by all the three procedures had a hospital stay of more than three weeks duration, which includes preoperative evaluation.The hospital stay is prolonged in patients who had wound infection and uncontrolled Diabetes. The association between the duration of hospital stay and type of treatment procedure performed was statistically not significant.

Recurrence

Recurrence of pain was more among patients underwent Puestow procedure(60%) followed by (37.5%) in Izbicke's procedure and least rate of reccurence was noted in Frey's procedure.

The results of most studies on the control of pain after surgical treatment of CP have limitations and interpretation of comparison due to lack of standardization of data collection on thissymptom. Also subjective symptom, evaluation of abdominal pain as a criterion for surgical success in postoperative should be taken with caution, since it is influenced by a series of psychological and social factors. The coexistence of mental disorders in alcoholics and patients dependent on opioids may interfere with the results of treatment. For this reason, the service of the authors routinely requires discontinuation of alcohol intake and consumption of cigarettes and narcotics, providing psychosocial support for these patients so that they can deliver better results not only in pain control, but also in global recovery. Thus, it is observed that the

operation is only part of a complex and multidisciplinary treatment that begins to prepare the patient for the procedure and should continue throughout the postoperative follow-up.The largest national study of the technique of Frey showed results of pain management in long-term similar to other published reports of remission of 91.4% in painful mean follow-up of 77 months. The results are consistent with those observed with most published series .

Time taken to heal

Average period for wound healing was two weeks in all the three procedures.The wound healing was prolonged in patients who had post operative wound infection and subsequent wound gapping which healed by secondary intention. The association between the time taken for wound healing and type of treatment procedure performed was statistically not significant.

CONCLUSION

In our study of 32 patients who presented with clinical and radiological features of chronic pancreatitis the following observations were made:

1. Recurrent attacks of abdomen pain and progressive insufficiency of endocrine and exocrine organ function.
2. It is more common in patients with alcohol abuse.
3. It's a diagnosis based on history, clinical findings, radiological investigations like ultrasound abdomen,CECT abdomen and MRCP in selective cases.
4. Treatment of chronic pancreatitis mainly focused on pain management,treatment of exocrine and endocrine insufficiency,prevention of weight loss and prevention of disease progression.
5. Duct drainage,Radical resective surgery and local resections are the most common surgical techniques in the surgical theraphy.
6. In this study three main surgical procedures namely FREY'S, PUESTOW and IZBICKE'S procedure were compared.
7. The difference between the duration of surgery, hospital stay, wound healing, per op and post op complications are satistically not significant.But the reccurence of symptoms is very low in FREY'S procedure (14.3%) compare to 37.5% in IZBICKE'S procedure and 60% in PUESTOW'S procedure.

8. Frey´s, proved to be highly effective in controlling abdominal pain secondary to this disease in longterm,combined with small interference on exocrine and endocrine function.

SUMMARY

- Chronic pancreatitis is a relatively rare disorder occurring in about 20 per 100,000 population.
- Chronic pancreatitis is characterized by inflammatory changes of the pancreas with fibrosis, calcification, pancreatic ductal inflammation, and pancreatic stone formation.
- It is more common in males compared to the females.
- Chronic alcoholism is the most common aetiological factor for developing chronic pancreatitis.
- Local resection of the pancreatic head, with or without duct drainage offer outcomes as effective as pancreaticoduodenectomy.
- Ductal hypertension with activation of stretch fibers and peripancreatic sensory nerve damage are the main causes for pain in chronic pancreatitis
- The recurrence of pain was often attributed to persistent or recurrent disease in the head of the pancreas.
- Pancreatico-duodenectomy(Whipple procedure), duodenal-preserving pancreatic head resection (DPPHR or Beger procedure), and local resection of the pancreatic head with extended longitudinal pancreatico jejunostomy (LR-LPJ or Frey procedure) are the three operative approaches have proven to be efficacious in chronic pancreatitis.

- The longitudinal pancreaticojejunostomy, or Puestow's procedure, is the prototypic drainage procedure for patients with marked dilation of the main pancreatic duct.
- Local resection of the pancreatic head with longitudinal pancreatico-jejunostomy (LR-LPJ) is known as Frey procedure.
- Longitudinal V-shaped excision of the ventral pancreas for small duct chronic pancreatitis with pancreaticojejunostomy is known as IZBICKE'S procedure.
- Among all, it is the Frey procedures which have a low recurrence rate. Surgical treatment of CP with anterior resection of the pancreatic head associated with pancreatojejunostomy, technique known as Frey´s, proved to be highly effective in controllingabdominal pain secondary to this disease in longterm, combined with small interference on exocrine and endocrine function. The technique of Frey should be considered as primary treatment for patients with CP accompanied by abdominal pain and increase in volume of the pancreatic head, because it is safe and easier to perform with less

  morbidity and more tality than other techniques.

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ANNEXURE

PATIENT PROFOMA

NAME :

AGE :

SEX :

ADDRESS :

IP NUMBER :

DOA :

DOS :

DOD :

CHIEF COMPLAINTS:

ABDOMEN PAIN :

DIABETES MELLITUS :

WEIGHT LOSS :

STEATORRHOEA :

PAST HISTORY;

TREATMENT DETAILS;

ANY OTHER ASSOCIATED ILLNESS;

PERSONAL HISTORY:

OCCUPATION ;

CLINICAL EXAMINATION:

CONSCIOUS LEVEL :

ANAEMIA-PRESENT/ABSENT :

ICTERUS/CYANOSIS/CLUBBING/PEDAL:

EDEMA :

VITAL SIGNS: PULSE :

BLOOD PRESSURE :

TEMPERATUR :

RESPIRATORY RATE :

CARDIOVASCULAR SYSTEM :

RESPIRATORY SYSTEM :

ABDOMEN EXAMINATION :

PER RECTAL ABDOMEN :

INVESTIGATIONS :

COMPLETE BLOOD COUNT-

BLOOD- urea - sugar –

SERUM- creatinine - electrolytes -

Cardiology fitness:

X ray chest-

SPECIFIC INVESTIGATIONS;

ULTRASOUND ABDOMEN:

CECT ABDOMEN:

MRCP:

DIAGNOSIS:

PROCEDURE DONE:

Post Operative Period

Management

Complications

FOLLOW UP OF PATIENTS:

6 weeks

12 weeks

3mont

RESULT:

நோயாளி ஒப்புதல் படிவம்

தலைப்பு: "அறுவைசிகிச்சை முறையின் COMPARITIVE STUDY OF DRAINAGE PROCEDURES IN CHRONIC PANCREATITIS.

யும்ஜயும் ஒப்பிடும்ஆய்வு, அரசு மோகன் குமாரமங்கலம் மருத்துவ கல்லூரி மற்றும் மருத்துவமனை, சேலம்"

பொது அறுவைசிகிச்சை துறை

நோயாளியின் பெயர்: வயது: ஆண்/பெண்

மரு.எண்:

எனக்கு இந்த அறுவைசிகிச்சையின் நோக்கம், மற்றும் அதன் செயல்முறை அனைத்தும் நன்கு புரிந்தது என உறுதி அளிக்கிறேன். எனக்கு அறுவைசிகிச்சை பற்றிய சந்தேகங்களை கேட்க வாய்ப்பு அளிக்கப்பட்டது எனவும், அவ்வாறு கேட்கப்பட்ட பொழுது, சந்தேகங்கள் யாவும் எனக்கு தெளிவாக எடுத்துரைக்கப்பட்டது எனவும் தெரிவிக்கிறேன்.

அறுவைசிகிச்சையின் பொழுதும் அதன் பின்னரும் ஏற்பட வாய்ப்புள்ள பின்விழைவுகள் யாவும் எனக்கு தெளிவாக எடுத்துரைக்கப்பட்டது. மேலும் இந்த ஆய்வில் நான் எனது சொந்த விருப்பத்தின் பெயரில் பங்களிக்கிறேன் என்பதனையும், தேவைப்பட்டால் எந்த விளக்கமும் அளிக்காமல் ஆய்வில்இருந்து என்னால் விலகிக்கொள்ள முடியும் என்பதனையும் நான் நன்கு அறிவேன்.

மேலும், எனது உடல்நல பதிவேடுகளை இந்த ஆய்வுக்கோ, பிற்காலத்தில் இந்த ஆய்வு தொடர்பான மற்ற ஆய்வுகளுக்கோ பயன்படுத்திக்கொள்ள, ஆய்வாளருக்கோ, கட்டுப்பாட்டு அதிகாரிக்கோ, நெறிமுறை குழுவினருக்கோ எனது சம்மதம் தேவையில்லை என்பதனையும் நான் நன்கு அறிவேன். என்னைப்பற்றிய விவரங்களையும் அடையாளத்தையும் சட்ட வலியுறுத்தல் இல்லாமல் மூன்றாம் தரப்பினருக்கு வெளியிட முடியாது என்பதனையும் நான் அறிவேன். இந்த ஆய்வின் வழியாக வரும் எந்த முடிவுகளையும் வெளியிடுவதற்கு நான் தடையாக இருக்க மாட்டேன் என உறுதி அளிக்கிறேன்.\

இதன்மூலம் இந்த ஆய்வில் பங்கேற்கவும், ஆய்வில் செய்யப்படும் அறுவைசிகிச்சைக்கும் முழுமனதுடன் சம்மதம் அளிக்கிறேன்.

மேற்கூறிய யாவும் எனக்கு நன்கு புரியும் எனது தாய்மொழியில் எனக்கு எடுத்துரைக்கப்பட்டது.

நேரம்: நோயாளியின் கையொப்பம்

நாள் :

இடம் : சேலம் நோயாளியின் பெயர்

ஆய்வாளரின் பெயர்

ஆய்வாளரின் கையொப்பம்

PATIENT CONSENT FORM

STUDY TITLE:

"COMPARATIVE STUDY OF OF DRAINAGE PROCEDURES IN CHRONIC PANCREATITIS., IN GMKMCH, SALEM"

Department of General surgery, GMKMCH

PARTICIPANT NAME: AGE : SEX: I.P. NO :

I confirm that I have understood the purpose of surgical/invasive procedure for the above study. I have the opportunity to ask the question and all my questions and doubts have been answered to my satisfaction.

I have been explained about the possible complications that may occur during and after medical/ surgical procedure. I understand that my participation in the study is voluntary and that I am free to withdraw at any time without giving any reason.

I understand that investigator, regulatory authorities and the ethics committee will not need my permission to look at my health records both in respect to the current study and any further research that may be conducted in relation to it, even if I withdraw from the study. I understand that my identity will not be revealed in any information released to third parties or published, unless as required under the law. I agree not to restrict the use of any data or results that arise from the study.

I hereby consent to participate in this study for various surgical/invasive procedures and their outcomes.

All of the above was explained to me in my own vernacular language.

Time :

Date :

Place :

Signature / Thumb Impression Of Patient

Patient’s name:

Signature of the investigator:

Name of the investigator :

KEY TO MASTER CHART

Sl. No. : Serial Number

M : Male

F : Female

P.I.: Previous Interventions

B.M.I.: Body Mass Index

L.S; lumbosacral

l.v; lateral view

N.R.A.: No radiological abnormality

I & D: Incision and Drainage

E.B.; Excessive bleed

Min; minutes

a; easy to perform

b; mild difficult to perform

c; difficult to perform

P.O.B ; Post operative bleeding present

P.O.P ; Post operative pain present

Col ; Collection

E.N ; Wound edge necrosis

W.I.: Wound Infection

W.D. : Wound Dehiscence

W.G; Wound gapping

Sl.no.	NAME	AGE	SEX	OCCUPATION	CECT ABDOMEN			TREATMENT			PER OP COMPLICATIONS	Duration of Surgery mins	Ease of surgery	POSTOP COMPLICATIONS	DURATION OF HOSPITAL STAY	TIME TAKEN FOR COMPLETE WOUND HEALING	FOLLOE UP
					DUCTAL AND PARENCHYMAL CALCIFICATION	MAIN PANCREATIC DUCT CALCIFICATION	BOTH	FREY'S PROCEDURE	PUESTOW PROCEDURE	IZBICKE'S PROCEDURE							
1	RAMESH	25	M	Manual labourer	PRESENT	PRESENT	PRESENT	+				175 mins	B		15 days	11 days	
2	PALANISAMY	42	M	Business	PRESENT	ABSENT	ABSENT			+	E.B.	160	B	P.O.P , W.I	14 days	16 days	Recurrence
3	VEERAPPAN	43	M	Manual labourer	PRESENT	PRESENT	PRESENT	+			ADHESION	190	C	P.O.P	22days	14 days	
4	ANAND KUMAR	30	M	Manual labourer	PRESENT	PRESENT	PRESENT		+			170	B		20days	12 days	Recurrence
5	PERIYANNAN	57	M	Manual labourer	PRESENT	PRESENT	PRESENT			+		175	C	P.O.P	17 days	14 days	
6	MURUGAN	27	M	Business	PRESENT	ABSENT	ABSENT			+		160	A	W.I	26days	21days	Recurrence
7	MANIMEGALAI	38	F	House wife	PRESENT	PRESENT	PRESENT	+				185	A		15 days	12days	Recurrence
8	RAVI	45	M	Manual labourer	PRESENT	PRESENT	PRESENT		+			165	A	Col, W.I	22days	30days	
9	Muthusamy	45	M	Manual labourer	PRESENT	PRESENT	PRESENT		+			170	B	W.G	25 days	28days	Recurrence
10	Silambarasan	29	M	Manual labourer	PRESENT	PRESENT	PRESENT		+		E.B.	190	C		18 days	20 days	
11	Ramalingam	39	M	Manual labourer	PRESENT	ABSENT	ABSENT			+		165	A	P.O.P	21days	12days	
12	Ponnumuthu	51	F	Manual labourer	PRESENT	PRESENT	PRESENT		+		E.B.	200	C		24 days	12 days	Recurrence
13	Arulmani	28	M	Manual labourer	PRESENT	PRESENT	PRESENT		+			160	A		25 days	12 days	
14	Barathy kannan	33	F	Business	PRESENT	ABSENT	ABSENT			+		175	B	P.O.P	28 days	18 days	
15	Muthu	44	M	Manual labourer	PRESENT	PRESENT	PRESENT	+			E.B.	185	A	W.I	31days	30days	Recurrence
16	Palanivel	41	M	Manual labourer	PRESENT	PRESENT	PRESENT			+		185	C		27 days	19 days	
17	Ramalingam	43	M	Manual labourer	PRESENT	PRESENT	PRESENT		+			180	A	W.G	29 days	33 days	
18	Abuhussain	39	M	Clerk	PRESENT	ABSENT	ABSENT			+		170	A		15 days	11days	Recurrence
19	Moorthy	33	M	Manual labourer	PRESENT	PRESENT	PRESENT		+			165	A	P.O.P	25 days	12 days	
20	Subramani	35	M	Manual labourer	PRESENT	PRESENT	PRESENT	+				195	C		16 days	62 days	
21	Shivamoorthy	34	M	Manual labourer	PRESENT	PRESENT	PRESENT		+			160	A		24 days	12days	Recurrence
22	Venkatesh	31	M	Manual labourer	PRESENT	PRESENT	PRESENT	+				175	A		22 days	14 days	
23	Subhash	34	M	Manual labourer	ABSENT	PRESENT	ABSENT	+				180	A		16 days	11days	
24	Tamaraiselvi	36	F	House wife	PRESENT	PRESENT	PRESENT		+			170	C	W.I	28 days	23 days	Recurrence
25	Suresh	33	M	Manual labourer	PRESENT	PRESENT	PRESENT	+				200	C		17 days	18 days	
26	Alagesan	41	M	Business	PRESENT	ABSENT	ABSENT			+	E.B.	175	B		19 days	11 days	
27	Arjunan	38	M	Manual labourer	PRESENT	PRESENT	PRESENT	+				195	C	P.O.P	26days	13 days	
28	Raja	37	M	Manual labourer	PRESENT	PRESENT	PRESENT	+				180	A	W.I	22 days	24days	
29	Vijaykumar	35	M	Manual labourer	ABSENT	PRESENT	ABSENT		+			180	A	W.G	25 days	31 days	Recurrence
30	Nausath	34	M	Clerk	PRESENT	PRESENT	PRESENT	+				185	B		26 days	11 days	
31	kumaran	32	F	Manual labourer	PRESENT	ABSENT	ABSENT			+		165	A	P.O.P	31 days	12 days	
32	BABU	43	M	Manual labourer	PRESENT	PRESENT	PRESENT	+				170	A		24 days	12 days	